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Actino-Therapy in Canine Practice.*

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Having from time to time received enquiries from veterinary surgeons upon treatment by light and its value and suitability in canine practice, it was thought that some detailed information, published in this way, might be of general assistance. It is with some diffidence that I attempt an essay upon this subject, since readers might naturally expect an exponent of this branch of medical science to be one who had devoted years to its study and practice. Actino-therapy is, however, quite a new departure in veterinary therapeutics, and I can only claim an acquaintance with it of some nine months' duration. During that time every opportunity has been seized to test out my apparatus on varying types of cases, and when suitable canine subjects were not available, I have tried it upon their owners, and sometimes upon my own relations. It was all for the good of the cause, and to-day I am able to record some of the results.

Radio-therapy is not by any means new to the *medical* profession, although no great attention was bestowed upon its potentialities until quite recently. It undoubtedly suffered a considerable measure of disrepute in the early days, on account of the earlier apparatus, no less than the technique, being crude, undeveloped, and little understood. It is, therefore, not surprising that the veterinary profession has hitherto paid scant attention to actino-therapy, preferring apparently to wait until the electrical trade had perfected its instruments, and the medical faculty had extended its knowledge of their use. It is easy to appreciate, too, that the lower animals offer to the veterinary surgeon difficulties and obstacles to successful treatment which are not experienced by the human practitioner. Thus, for these and other reasons, we may, as a body, be excused, perhaps, if we appear to have failed to keep abreast of the times. Before considering the clinical aspect of the matter, it seems desirable, in order to make subsequent observations clear, to give a brief description of the various light rays in the sun's spectrum.

The Electro-Magnetic Spectrum is composed of a continuous series of known octaves of radiant energy, visible and invisible, and classified according to wave length and frequency. The rays which compose sunlight have wave lengths between about 3,000A° and 7,700A° (Angstrom units are units of measurement) which figures are the *limits* of the sun's spectrum. The visible part of this spectrum lies between 4,000A° and 7,700A° and forms the well-known combination of violet, indigo, blue, green, yellow, orange and red. The only ultra-violet rays which reach earth from the sun are those whose wave lengths lie between 3,000A° and 4,000A°.

In actino-therapy the only other part of the entire spectrum which interests us is that further octave of ultra-violet rays which lies between 3,000A° and 2,000A°. In other words, our activities with ultra-violet and artificial sunlight will involve dealing with rays which are no shorter than 2,000A° and no longer than 7,700A°. The band of ultra-violet between 2,000A° and 3,000A° is that which can be produced artificially, or without the aid of the sun. Ultra-violet ray is called ultra-violet because it lies just beyond the violet of the visible spectrum. It is known also as the actinic ray, by reason of its power to excite chemical action, and because the effect it produces upon photo-

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The Spectrum.

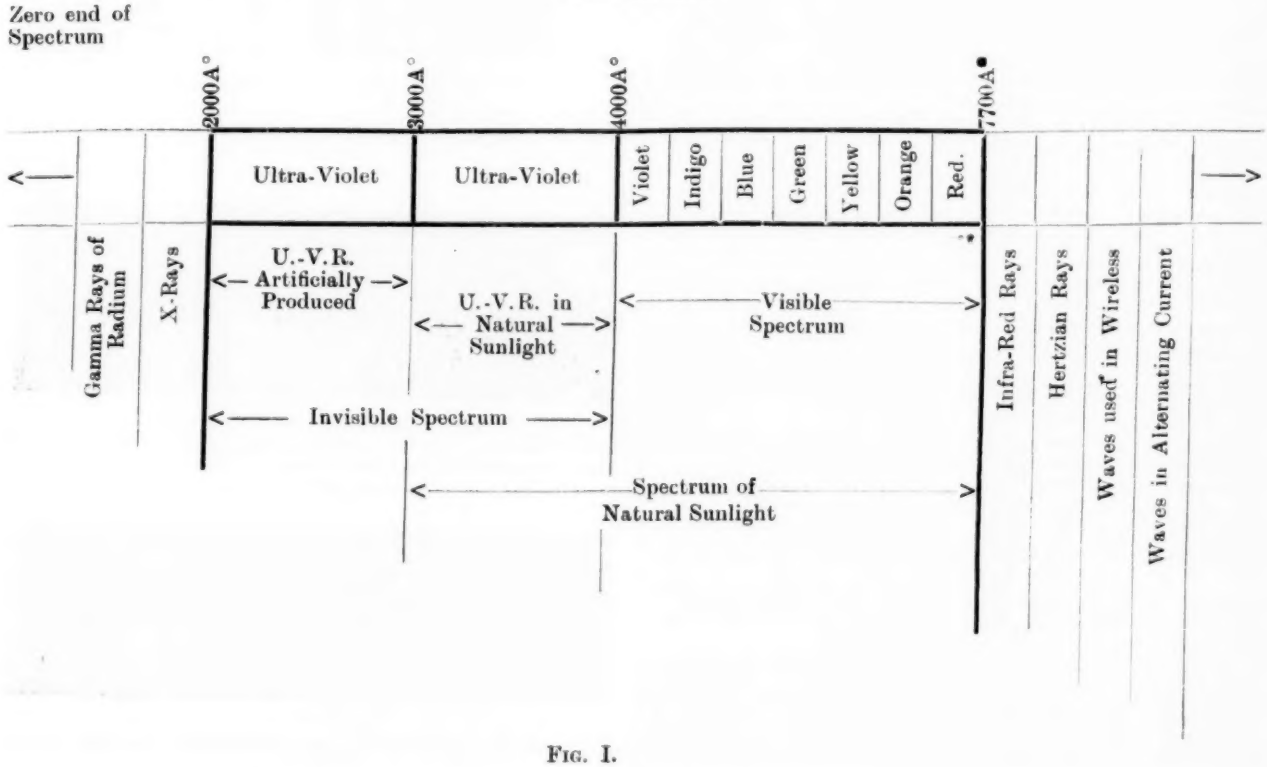


Fig. I.

sensitive paper is more pronounced than that of any of the other light rays.

The sun, of course, emits rays of infinitesimal wave length, but these are said to be absorbed in the ether, probably millions of miles away from the earth's surface. It is estimated that the shortest wave length which actually reaches earth is that of 3,000A°. Reference to Fig. 1 should clarify this matter somewhat.

Wave Length.—I should here explain what wave length really means. Light is propagated as a succession of waves in the ether, much as waves in water are propagated, and is caused by the periodic vibration or rotation of electrons. Light always travels forward in an absolutely straight direction, and although each ray may advance as a wavy line, its direction is still straight. Wave length is the distance between any two corresponding points on successive waves, as for instance, from crest to crest (see Fig. 2), and it is measured in terms either of the Angstrom unit (Aμ or A°) whose length is one ten-millionth of a millimetre, or of the millimicron ($\mu\mu$) 1/1,000,000th of a mm. Therefore 4,000A° equals 400 $\mu\mu$ (millimicrons). Another measure is the micron (μ) which is 1/1,000th of a mm.

It has been found that each element has its own characteristic spectrum at a given temperature. If it be visible, the colour is indicated by the length of the waves, and its brightness by their amplitude, or, expressed a little differently, from the colour of the light the rate of vibration of the atom can be determined. All waves of light travel at the same rate, *viz.*, 186,200 miles per second, irrespective of wave length.

The Complete Spectrum. Starting at the zero end of the spectrum, a progressive increase of wave length takes place from the shortest known rays recently discovered by Millikan, through the very short gamma rays emitted by radium onward through X-rays to the five octaves of ultra-violet. The latter are divided into extreme (with which we are not directly concerned), middle (2,000A° to 3,000A°), and near ultra-violet rays (3,000A° to 4,000A°). Then follow luminous rays (4,000A° to 7,700A°), beyond which come the heat rays commencing with infra-red, then Hertzian waves, wireless waves, and finally those of alternating current. When one considers that the wave length of wireless in London is 360 metres, it is easier to realise how extraordinarily minute are the waves of ultra-violet light.

The actino-therapist is not, however, concerned with any rays outside the limits of 2,000A° and 7,700A°. The wave lengths of rays from the various lamps on the market are not so much dependent upon the type of lamp employed as upon the nature of the electrodes burnt in them. For instance, if one is working with an open arc apparatus, the electrodes may be of pure tungsten, or of cored carbons filled with various metals. Carbon is commonly used as a base because it produces the necessary intense heat for fusing its contained metals, and because it produces a section of wave lengths peculiar to itself (see Fig. 4). To obtain varying wave lengths different materials are incorporated in the carbon. Some cores are very complex, in order to build up the complete spectrum of perfect sunlight. Among such materials are iron, boron, magnesium, sodium and calcium. Each type of electrode has its own characteristic spectrum and the rays it emits will have a varying therapeutical value.

The quartz mercury vapour lamp, however, produces certain wave lengths and those only. It produces a few bands in the visible spectrum, but in the invisible region it emits massed rays of about 2,500A° to 2,800A° wave length (see Fig. 5). This lamp is sometimes, though erroneously, called an Alpine sunlight lamp, but it gives no sunlight at all. The sun emits rays of wave lengths between 3,000A° and 7,700A° and any light, whether naturally or artificially produced, which cannot show this spectrum is not equivalent to sunlight.

Effects of Various Rays.—The infra-red rays may burn the parts exposed to them; they cause marked dilatation of vessels, increase of erythrocytes and decrease of leucocytes. They are capable of penetrating the skin to a considerable depth, and exercise an analgesic effect in consequence of the erythema produced and their action upon nerve centres.

Fig. 2. Wave length measured from crest to crest).

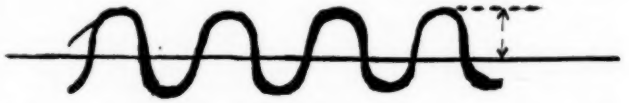


Fig. 3. Amplitude measured from crest to zero line.

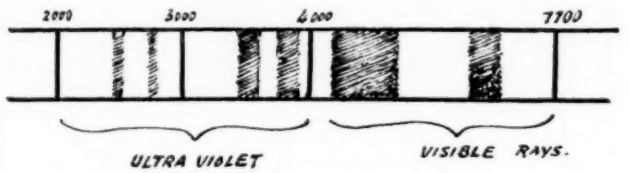


Fig. 4. Plain carbon Arc Spectrum.

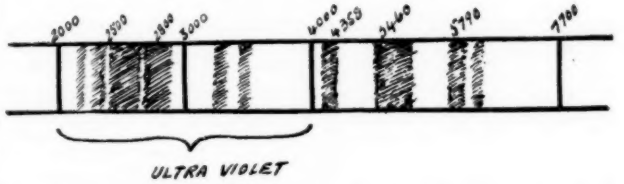


Fig. 5. Spectrum of Mercury Vapour Lamp (showing massed rays in the green at 5,460A° and a broad band of U.V.R. between 2,500A° and 2,800A°.

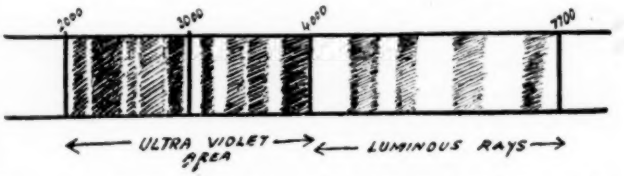
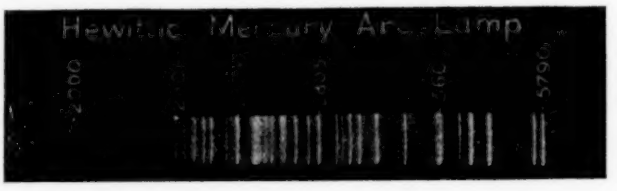


Fig. 6. Tungsten Arc Spectrum (showing bands over the whole ultra-violet area.

Spectrum of "Westminster" Arc Lamp, obtained from impregnated carbons and single arc, consuming approximately 30 amperes.



Spectrum of "Hewittic" Quartz Mercury Vapour Lamp.

The luminous rays have no bactericidal action and they do not produce erythema or sunburn. During the passage of natural sunlight through the ether only 39 to 43 per cent. of ultra-violet and violet rays, and 70 per cent. of red and infra red rays are transmitted to the earth. The rest is lost. The more dust, damp or fog which exists in the atmosphere the less ultra-violet ray comes through. Hence the health-giving properties of mountain air.

The ultra-violet rays (U.V.R.) have definite photo-chemical properties; they may produce a marked erythema and sunburn after a definite latent period of about five or six hours. No warning of this effect is conveyed to the patient at the time of irradiation. The ultra-violet rays penetrate the skin but very slightly—say $\frac{1}{10}$ mm. They have a definite bactericidal action.

Walsh and Stainton published in the *Vet. Journal* last July the results of some experiements they carried out to test the bactericidal power of U.V.R. They stated that when a smear from a culture of ***B. coli*** was made on agar in a Petri dish and exposed directly to a mercury vapour lamp at twelve inches for five minutes, the result was a profuse growth of organisms after twenty-four hours' incubation. On the other hand, Russell states that he exposed a culture similarly to the radiations from the same type of lamp at a distance of ten inches and found all the organisms killed after five seconds exposure. It is difficult to reconcile these two results, and it seems that further experimentation will be necessary to decide the point.

The ultra-violet which emanates from a mercury vapour lamp will, in a few seconds, kill infusoria floating in water. It will kill bacilli on the surface of a wound, but it cannot penetrate to those underneath. It, therefore, has a rapid bactericidal effect but no power of penetration.

The rays are, however, absorbed, and later, heat is generated. An overdose might occasion severe burning with the formation of vesicles; therefore exposures of the skin to a mercury vapour lamp must be very short. The rays are absorbed very rapidly and become irritant; nor is the erythema produced any guide as to the benefit being conferred upon the patient, because individuals react so varyingly.

Pacini found that if bacteria are added to water which was previously sterilised by U.V.R., they die within an hour. The resistance of bacteria to U.V.R. does not vary in the same way as it does to antiseptics and heat. Spores are often twenty times more resistant to chemicals than are bacteria. But their resistance to U.V.R. is in the ratio of only 1 : 5. The rays of short wave length will not penetrate hair.

From the tungsten arc it is possible to obtain as great an intensity, or greater, of short wave length rays as can be obtained with any lamp in existence; and it is these short length rays which are of the greatest therapeutic value (see Fig. 6). Pure tungsten is commercially too dear, and endeavours have been made to fill cored carbon electrodes with tungsten paste. This has not, however, proved a very satisfactory substitute. Iron has proved most useful, and iron cored carbons have been found to burn very evenly and give a fine output of ultra-violet. Many metals were tried in combination with carbon, and it is now possible to obtain cheap cored carbons which give a wide spectrum, intense ultra-violet with rapid killing powers and good penetration. Tungsten steel electrodes are now much in vogue; they emit intense ultra-violet bands and are very much cheaper than those of pure tungsten. These are what I use mostly in practice for local applications.

Rays with Wave Lengths of—

1,800—2,000A° are absorbed by the ether.

2,000—2,400A° are absorbed by the outer layer of the epidermis and will kill bacteria on the surface of an ulcer. They cannot penetrate.

2,400—2,900A° are bactericidal, and absorbed by epidermis. They can produce erythema and eventual pigmentation. Have no power of penetration.

2,900—3,300A° have little bactericidal effect, but can penetrate the deeper layers of the skin and are absorbed. Erythema and pigmentation produced.

3,300—4,000A° penetrate the blood stream and are absorbed thereby, becoming converted into heat. No bactericidal power.

4,000—7,700A°. These are visible rays.

The shorter the wave length the thinner the layer of skin which will completely absorb it. Rays of about 3,000A° have probably the greatest therapeutical effect, being possessed not only of power of penetration but, to some extent, of killing organisms. The Law of Grotthus is to the effect that light is only active when it is absorbed.

Basal cells being colourless, do not absorb visible light, but readily absorb ultra-visible light.

Transmissibility of Glass to U. V. R. It is said that ordinary glass will not pass ultra-violet rays. From carefully conducted experiments it has been ascertained that common glass absorbs some of these rays but certainly not all. Luckiesh gives the following table which, I believe, has been universally accepted:—

He could pass U.V.R. through	common glass	to	2,950A°.
,,	,,	,,	,,	,,	light crown to 2,950A°.
,,	,,	,,	,,	,,	light flint to 3,050A°.
,,	,,	,,	,,	,,	Schott's heavy flint to 3,400A°.

Hill has recently demonstrated that "Vita-glass" has the property of transmitting rays down to 2,750A°. It is thus freely transparent to all the U.V.R.s which occur in sunlight. On the other hand, we see from the above table that common glass will transmit to 2,950A°, and as the shortest rays from the sun which are able to reach this planet are those of about 3,000A° wave length, we see that there is little to be gained by substituting vita-glass for ordinary glass in cowsheds or kennels, etc.

In either case, if the glass is not absolutely and chemically clean the short wave lengths are absorbed in the dust or moisture on its surface. Special electric light globes fitted with tungsten filaments and made with special glass are now sold at very high prices and they undoubtedly do emit a small amount of ultra-violet; but it makes little difference whether the glass of the globe is ordinary glass or vita-glass, because tests made with the spectroscope showed that almost the same amount of U.V.R. was obtained in each case.

In any event, the U.V.R. emitted is so infinitesimal that it is useless for practical purposes.

Reflection of U. V. R.—So far as reflection of U.V.R. is concerned, the imposition of white walls or sheets around a patient is useless, as these things reflect nothing which is invisible. In the same way, X-rays cannot be reflected, but go straight ahead until they reach a point where they are absorbed. Bragg used a crystalline structure to refract X-rays and was successful. So that, in the case of snow blindness, it is highly probable that this condition is not caused by reflected visible rays, but by reflected invisible rays through the agency of minute ice crystals. Silicon and nickel are among the best metallic reflectors, but so very little U.V.R. is reflected by any material that a lamp without a reflector would be practically as useful as one with.

General Effects of Ultra-Violet Irradiation on the Body.—The therapeutic value of ultra-violet rays, in certain types of case, seems no longer to be disputed or doubted by those competent to judge, and I think we can safely approach the subject with the definite belief that benefit *can* be derived from their use. We must be careful however, not to expect these rays to be a panacea for all ills, nor to allow our judgment to be warped by disappointments when, in reality, we have no right to expect anything else. In order, therefore, to determine which maladies would be most amenable to treatment by ultra-violet light we must first consider its action upon the living body.

Effect upon the Skin. The effect of U.V.R. upon the skin is very marked and important. Nothing is felt during the irradiation and no reddening is noticed at the time; but after a latent period [which varies with individuals (though usually from four to eight hours after exposure)] a feeling of heat is experienced. According to the dosage, this may be increased even to the point of burning and blister formation. Indeed, some human patients have

been known to die from over-dosage. There are four degrees of reaction upon the skin :—

1*st degree.*—A slight reaction, and the patient has no subjective symptoms. There may be slight reddening, but the animal has no visible exfoliation of the skin.

2*nd degree.*—Definite reddening like sunburn, and slight exfoliation.

3*rd degree.*—Intense reactions as of severe sunburn; intense erythema and the epidermis can be peeled off in large strips.

4*th degree.*—Blister formation.

The hyperæmia is, of course, due to dilatation of the surface capillaries. The epidermal cells are swollen. The chromatic or nuclear substance of the cells absorbs the ray, and chromatin is broken up. The result is a bronzed skin (pigmentation) which is caused by the presence of melanin granules. These granules form a screen around the nuclei of the cells and protect them from a further overdose of U.V.R. Thus, Nature, by this means, has provided an automatic defence. All patients do not pigment to the same degree. Those which do not pigment do not derive so much benefit from U.V.R. as otherwise they might. Sequeira found that he was able to produce pigmentation more rapidly with the carbon arc than with the mercury vapour lamp. Among human patients it is said that blondes pigment more than brunettes, children more than adults, and women more than men. The last point is, however, debatable.

Normal healthy skin will be found to react much more readily than diseased areas. The erythema produced will form some guide to the response or reaction of a particular animal, and for the sake of safety it is advisable to give a very brief exposure in the first instance, in order to test the patient's susceptibility.

The absorption of U.V.R. by the skin, especially the rays of very short wave length, is very great, all rays shorter than 3,000A° being absorbed by a layer of epidermis 0·1 mm. in thickness. Rays must be absorbed in order to become effective, and in this process electro-chemical and other changes are set up. The conversion of light into heat stimulates the sweat glands, and if one watches intently whilst a dog is being exposed to U.V.R. it is possible to discern minute beads of moisture appearing upon the skin, which, if wiped away, will soon be replaced by others.

Irradiation of the skin by ultra-violet makes it a very difficult matter to infect that skin, and we do know that acne and boils are unknown among the black tribes.

Dr. Troupe, whose lectures upon this subject I attended last year, stated that it was possible to sensitise animal cells by the administration of eosin, chlorophyll, resorcin, etc., in such a way that abnormal conditions could be brought about by exposure of the animal to ordinary visible light which otherwise could be produced only by exposure to ultra-violet light. With reference to this matter, Russell relates an experiment in which a mouse was sensitised by eosin, and so long as it was kept in the dark nothing happened, but, upon exposure for a few hours to sunlight, it died. Hæmatoporphyrin (another sensitising agent and a derivative of hæmoglobin) is produced when the skin is exposed to U.V.R. and the skin is rendered fluorescent by it.

As a result of the absorption of U.V.R. by the skin, Pacini states that "there is at first a period of vasodilatation which is followed by a period of vasoconstriction if irradiation is continued." The invariable fall in arterial blood pressure, which has been observed by so many writers on the subject, is probably due to this initial vasodilatation.

Effect upon Nerve Endings.—There is no doubt that ultra-violet radiation has a marked analgesic property, and probably organs at a distance from the site of radiation are influenced reflexly. I have proved its sedative effects recently upon four human beings, the first of whom was a lady suffering from a boil upon the eyebrow. I gave two-minute exposures of this boil to a tungsten arc once daily for four days. Each irradiation relieved all pain for several hours and the boil subsided without rupturing. The next was a lady with very painful auricular furunculosis. It was possible to focus the rays upon the group of boils in one operation, and two-minute exposures would arrest all pain and throbbing for considerable periods. After four exposures the condition was aborted. The third case was a lady suffering from neuritic pains about the ankle which had endured a week and prevented her from taking much exercise. I gave this ankle one general irradiation for five minutes and learned afterwards that by the evening the pain had gone and the lady was able to play tennis the following day. The last case was that of a gentleman friend who suffered great discomfort and irritation about the perineal region from old standing prostatitis. To test the capabilities of U.V.R. I persuaded this man to be treated, and unfortunately I gave him a somewhat severe dose. The region of the anus, urethra and surrounding part were exposed to a pure tungsten arc for ten minutes at eight inches and the following morning I had a telephone message to the effect that whilst all internal pain and uneasiness were gone, he could hardly sit down. I am following up this case, as the victim is confident it has done him a deal of good. Dogs with painful skin lesions seem to become less irritable whilst undergoing the treatment, and one must assume that they experience a dulling of the pain.

Dr. Halls Dally suggests that superficial pain sensations may be allayed by direct action upon inter-epithelial nerve fibrils; the true mechanism is, however, not definitely known.

Effects upon the Blood.—Blood serum absorbs all rays below 3,000A° and normal blood absorbs all rays with wave lengths less than 4,500A°. How the rays are absorbed or stored in the body is not yet known. The results, however, have been observed and are numerous and far reaching. Rollier asserts that the increase of erythrocytes is constant in his patients; that hæmoglobin may be increased 20 per cent.; and most students of the treatment agree that a lymphocytosis is set up and that there is an increase of blood platelets. If an increase of leucocytes does not occur, it shows that the patient's resisting powers are low. Sometimes the increase occurs only after a few weeks of tonic raying.

Many believe, and have sought to prove that the bactericidal properties of the blood are increased. Rays having a wave length of about 3,000A° penetrate to a depth of from 80 to 130 μ, but it is believed by Doctors Eidenow and Hill that the germicidal powers of the blood are enhanced by giving systematic irradiations of from five to ten minutes twice weekly or for sufficient time to produce erythema. I have found that much more than ten minutes exposure of a dog's shaved skin is often necessary in order to produce erythema, though this, of course, depends also upon the distance between the patient and the flame.

The chief chemical changes in the blood are represented by increases in its calcium, phosphorus, iron, and iodine content. These assertions have been proved by experiment, and it is thought to be in a large measure due to the increased calcium and phosphorus that ultra-violet irradiation is so beneficial in cases of rickets. A deficiency in calcium causes weakness and debility, but if the calcium content can be augmented it forms a factor in the animal's general well-being and increased resistance to disease. Calcium aids the coagulability of the blood, and Troupe suggests it is good treatment to give U.V.R. to a patient just prior to an operation, as he considers there is less risk of hæmorrhage and shock. The ductless glands are stimulated and the vitamines in the body are rendered more active, especially the fat soluble Vitamin A. The general results of these influences is a feeling of buoyancy and rejuvenation Exposure to ultra-violet causes a dilatation of surface vessels and therefore a reduction of blood pressure. In time, muscular and mental activity are augmented and the general health improves.

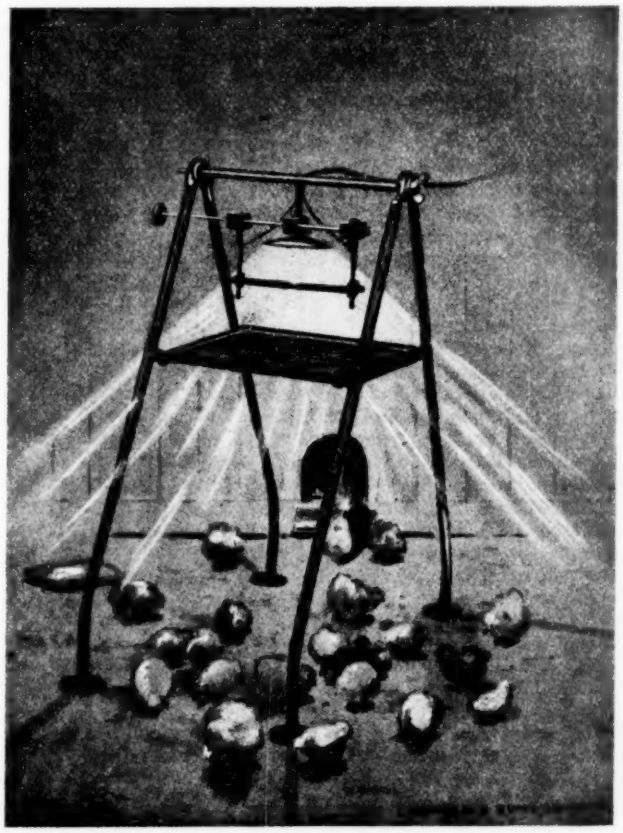
Effects upon Bacteria.—Rays having shorter wave lengths than 2,800A° appear to exert a lethal effect upon

bacteria, but since they are incapable of penetrating deeper than a few microns their usefulness in this direction is almost *nil*. Ultra-violet rays are absorbed by the protoplasm of the germ, and in a culture, or on the surface of a wound, etc., one bacterium will protect a second lying under it; so, in a lesion such as lupus, the whole beneficial therapeutic effect cannot be considered to be due alone to the bactericidal effect of the rays, but is also due to an increased bactericidal property of the blood itself, increased lymphocytosis in the part, and stimulation of cicatrisation.

"The destructive effect upon bacteria is, apparently, due to coagulation, one view being that ultra-violet radiation kills living cells and tissues by affecting their protoplasm in such a way that it is made possible for certain salts to combine with the protein of the protoplasm and form insoluble compounds" (Russell).

These references to the works of Russell, Rollier, Hill and others are essential in the commencement because it is upon the facts and theories enunciated by them that the subject can be profitably discussed. Using their observations as a basis, it then devolves upon the veterinarysurgeon to work out the many problems among the lower animals and affirm or dispute the value of light as a therapeutic measure. This is my sole object in wading so laboriously through the technical details before attempting a discussion upon the more practical side of the matter.

EFFECTS UPON METABOLISM.—All students of actinic radiation seem agreed that light effects a general increase in metabolism, although they cannot precisely explain how this occurs. We *do* know that the amount of carbon dioxide expired is increased. It may, of course, be due to the chemical changes which occur in the blood. Probably one of the most convincing proofs of this metabolic stimulation is the influence of U.V.R. upon rickets. Ultra-violet radiation is said to have the power of activating vitamines in the body. In fact, it is suggested that "the reason why cod liver oil is beneficial in rickets is that the oil itself emits ultra-violet rays when oxidised" (Russell).



Irradiating Chicks against Leg Weakness.

Interesting experiments were made by Marjorie Luce in which some cows were kept in dark byres and others in sunlit fields. She noticed that in feeding other animals upon the respective milks, their growth was the same in both cases, but the animals fed on milk from the cows in the byres were much more liable to rickets than were those fed upon milk from the cows kept in the open. An interesting article appeared on this matter in last December's *North American Veterinarian*.

Bearing upon metabolism, too, one may quote a case reported by Rollier, of a man, aged 45, who suffered from benign diabetes mellitus of several years' standing. The glycosuria was easily controlled by dieting. Under heliotherapy the glycosuria practically disappeared on ordinary diet; but twenty-four hours without a sun bath brought the sugar back again.

EFFECTS UPON THE EYE.—Rays of wave lengths from 2,950 to 3,800A° are absorbed by the lens and cause it to fluoresce or become luminous. This fact serves to protect the retina. Rays of wave lengths less than 2,900A° are absorbed by the cornea and conjunctiva causing more or less acute conjunctivitis and corneal opacity in about five hours, if exposed for about three minutes. It is, therefore, highly advisable for an operator to wear special goggles and insist upon his assistants and the patient doing likewise. The patient's eyes can usually be protected by one's hand or a duster.

DISEASES TREATED BY U.V.R.—From experimental observations, coupled with theoretical deductions, one might be led to believe that certain disease conditions could not fail to be benefited by exposure to U.V.R. But from clinical experiences I find that this is not so. One case of eczema, for instance, might respond wonderfully to U.V.R., whilst another would not be affected. I have not as yet found an explanation of this phenomenon; but I *can* state that the practitioner who is equipped with an apparatus must just conduct trial treatments and make no definite promises to his clients. There is as yet much to learn, but our technique will in due course improve and our results be more certain.

The diseases which have been successfully treated by heliotherapy are multifarious, and of all them, perhaps, the skin diseases have yielded the most notable results.

Eczema.—Ultra-violet has proved a valuable therapeutic agent against this common condition. In chronic cases a third degree erythema is necessary, after two productions of which the pruritus has often disappeared. In acute cases a weaker reaction is more beneficial, and where there are discharges these must be removed prior to treatment. If possible, it is advisable to treat generally as well as locally, and in obstinate cases as many as twenty exposures may be necessary before a cure can be effected. I have in mind a bulldog which suffered from weeping eczema about the base of the tail and on the scrotum. Only two applications from a tungsten lamp at twelve inches for five minutes were required to dry these up and stop the irritation. A Sealyham affected with moist eczema of the face apparently obtained no benefit from irradiations (pure tungsten being used). On the day following the first exposure the cheek was found in a state of great œdema and tenderness which at first I attributed to an overdose of U.V.R., but which was due probably to traumatism. The part was poulticed with an ointment and the lesion quickly subsided and cleared right away. My office cat developed eczema along the course of the spinal column (a common situation for the disease in cats) and three exposures of five minutes each to an iron-cored carbon subdued the irritability and dried up the lesions very considerably. A Fox terrier was entirely cured of eczema after five exposures on consecutive days.

Pruritus yields readily, in most cases, to actinic light.

Acne may be successfully treated by light alone, although it is unwise to neglect other medicinal measures such as diet and the avoidance of constipation.

Boils.—As I have already shown, U.V.R. will very often abort boils and will at least rob them of pain. Boils and carbuncles represent lowered local and general resistance, so that local and general treatment should simultaneously be given.

Psoriasis.—This disease is rarely found in parts of the body which are normally exposed to sunlight. Cases usually clear up, and Troupe found that nine exposures were sufficient to cure a case two years old. He gave local and general treatment.

Urticaria.—The severe itching of urticaria is relieved almost at once by U.V.R.

Chronic Indolent Ulcers from any cause, are greatly benefited by second degree stimulation of an arc lamp. The effect is due not only to the bactericidal properties of the rays, but to their stimulation of epithelial and granular tissue growth. Of course, bacterial necrosis, so often seen in cats, would come under this heading.

Pruritus Ani.—This is a condition very peculiar to dogs, and if one can ascertain no removable cause for it, the exposure of the anal region at twelve inches distance for from three to five minutes will frequently subdue all irritation. The parts must necessarily be denuded of hair and excrement before exposure to the rays. I treated a case in a Pekingese only two days ago giving ten minutes exposure at a foot distance. The pruritus in this instance disappeared after one dose.

Alopecia.—For the cure of localised alopecia, probably as many as twenty-four exposures will be necessary to effect a new growth of hair. A Harley Street doctor told me he had known no failure if only the patient would persist and not lose heart. In these cases the erythema must be produced two or three times a week. It has been repeatedly noticed how rapidly healthy hair will grow under the influence of U.V.R., should it happen to remain uncovered during treatment. (As an example of the hair-growing property of light I might direct your attention to Mr. Brown's head, for he habitually wears no hat.)

Ringworm.—Obstinate cases of ringworm were often eventually disposed of by exposure to X-rays. This is not now considered so good as ultra-violet because, whilst the latter kills the fungus and not the hair, X-ray sometimes kills both.

Follicular Mange.—No success has been attained in these cases, and although in an Aberdeen terrier with a localised lesion on the neck, I produced a third degree erythema, the disease pursued its normal course.

Sarcoptic Mange.—On the other hand, Russell records a case of mange in a cat which was cured by ten applications of ultra-violet, no other therapy being employed. I have grave doubts, however, as to the manner in which the cure in this case was effected.

Finally, I may be excused perhaps, for mentioning that in the human being, chilblains, impetigo, shingles, X-ray dermatitis and lupus have yielded splendid results from exposure to U.V.R. *Chilblains* which are thought to be due to defective peripheral circulation and lack of calcium, are quickly amenable to light treatment. *Impetigo*, as I have personally discovered, is soon curable, for I treated the son of a veterinary surgeon who had suffered from it for eight months until he came to me. He received daily exposures of tungsten light at ten inches distance first for three, then four, and finally nine-minute periods, over fourteen days, and was then quite healed. A Colonial appointment might have been denied him had he not recovered quickly. As to *shingles*, its average duration without U.V. treatment is five weeks. With the rays it is five to ten days and the disease can always be cured, without exception. Against *X-ray dermatitis*, U.V.R. are the recognised cure. Finssen was the first to employ U.V.R. for the treatment of *lupus*, and he used a carbon arc lamp with great success. He produced a fourth degree reaction so as to destroy the diseased tissue and promote the growth of healthy tissue. General irradiation was also carried out, and Dr. Sequeira, of the London Hospital, states that the percentage of cures is now 60 to 90 per cent.

One may perhaps be pardoned for introducing medical practice into a veterinary paper, when I state that my object is merely to show what a power for good is wielded by these invisible rays in conditions other than those *we* are accustomed to treat.

Pyorrhœa.—I have the most authentic evidence from dentists that many cases of pyorrhœa have in their practices been permanently cured. Receding gums have contracted and loose teeth tightened, whilst pus in the alveolus has eventually disappeared. I had a shocking case two weeks ago in a ten-year-old Yorkshire terrier, and although I commenced U.V.R. treatment, I soon realised in that instance that nine extractions were inevitable.

Generally, then, in all skin diseases it will be seen that a second or third degree of reaction must be produced for successful results to ensue. The great thing is "antisepticism" and as every surface exposed is rendered antiseptic (with certain wave lengths) the reason of its success is made plainer. In all cases, too, general as well as local irradiation is the better plan.

Rickets is a condition upon which much work has been done, and most extraordinary results have been obtained by the use of ultra-violet. For children it is practically a specific. For dogs it is not so easy to apply, though equally efficacious. I have just been treating a Great Dane puppy for distemper and advanced rickets. The dog had all the hair clipped from the sterno-abdominal surface, and was irradiated five times for fifteen minutes each. In addition, it received $\frac{1}{10}$ gr. parathyroid gland and v. gr. calcium lactate twice daily, and a ration of 3lbs. of raw meat. At the end of three weeks in my hospital the improvement was really remarkable. It had, unfortunately, then to return home on account of expense. Usually about twenty exposures of U.V.R. are required to effect a complete cure. The case looked at first almost incurable.

The calcium and phosphorus content in the blood is responsible in great measure for the integrity of bone structure and the growth and calcification of the skeleton. Ultra-violet increases the calcium and phosphorus content by extracting these salts from the bowel. It is, therefore, logical simultaneously to feed these salts to the affected animal. U.V.R. activates the endocrine glands, and in this additional way ensures the production of anti-rachitic substances.

In 1919, Huldschinsky placed it on record that at a home for crippled children in Berlin, artificial U.V. radiation was *more* effectual than sunlight and cod liver oil. He found that raying a child for two minutes a day with a mercury vapour lamp at a distance of three feet afforded protection. Preventive treatment of rickets may be begun as soon as preganancy is proved. In expectant mothers an increased amount of calcium is a necessity, since there is a great drain upon their normal supply; owing to this, the seeds of rickets may be sown in the offspring before it is even born. After parturition, light treatment should still be given to the mother throughout lactation.

Rheumatic Manifestations are all greatly benefited by ultra-violet, and, in man, early cases of lumbago may be cured by even two applications. Stubborn cases will yield after a course of about twelve treatments. Rheumatism and rheumatic arthritis can be arrested in their progress, although it is desirable to combine other forms of treatment. If septic foci exist, these must of course be removed.

In Sprains the length of treatment can be reduced very considerably provided that a sharp reaction is produced. This should be of particular interest to veterinary surgeons in charge of racing stables and might be very well worth trying.

Otorrhœa and Otitis are both improved and sometimes cured by actino-therapy. You may remember the case of a Sheep dog which I reported some months ago in the *Record*. It had been treated for 4½ months by other methods with no success. Then seven applications of U.V.R. dried it right up. The improvement was unfortunately not permanently sustained.

Burns of all kinds heal much more quickly if given small and frequent doses of ultra-violet light.

Time will unfortunately not permit of further enlargement upon the diseases which may be dealt with by actino-therapy, so that I will be content merely to enumerate some of the remainder as follows: Tuberculosis, whether generalised or of joints or glands; sciatica; gastric and duodenal ulcers; colitis; cirrhosis of the liver; chorea; neuralgia; neurasthenia; anæmia; leukæmia; colds; asthma; bronchitis; general debility, and many more.

CONTRA-INDICATIONS.—There are various circumstances which contra-indicate the use of actino-therapy, and these are:—1, gouty conditions, because in gout the calcium content of the blood is already increased; 2, phthisis, when a febrile condition exists; 3, if it depresses instead of exhilarates the patient; 4, any case with a temperature; 5, waxy disease of any organ; 6, the acutely ill; 7, the very old; 8, advanced heart trouble; 9, tuberculosis of both kindeys; 10, when the skin is still peeling from a previous treatment.

THE CHOICE OF AN APPARATUS.—The animals which I consider are the most likely to be treated by light are the small species, such as dogs, cats, monkeys, and the like. Nevertheless, there is really nothing to prevent one from working upon horses and cattle, except that the apparatus would have to be powerful, and especially installed and protected from injury, in some place to which large animals could be brought. For all animals, there are two main types of apparatus available, *viz*: mercury vapour and the open arc. In both cases, of course, the light is derived from an arc formed by an electric current passing between two electrodes or terminals. Such electrodes may be composed of tungsten, tungsten steel, or cored carbons, such as I have here; or the arc may be formed in a mercury vapour, enclosed in a quartz tube. The mercury vapour lamps are either air-cooled or water-cooled, the former type being generally adopted for systemic irradiation (*i.e.*, for use over large areas) and the water-cooled type for local treatment. The latter are furnishes a preponderance of very short wave ultra-violet, and is best exemplified in the Krohmeyer lamp, which is the one used by my dental friends in the treatment of pyorrhœa. The radiations are applied by means of quartz compressors or transmitters, and the parts treated are rendered bloodless, so as to produce a more intense local reaction, without the fear of causing a systemic reaction.

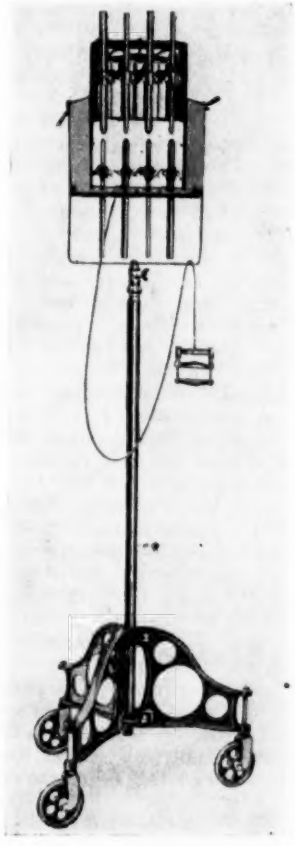
There are many disadvantages with such an apparatus, such as its initial cost, which may be from about £40 to £100; its cost of upkeep and difficulties connected with the circulating water. Furthermore, a quartz mercury vapour lamp gives practically no U.V.R. after 300 or 400 hours. When such lamps are first started off the output is high, but would deteriorate rapidly if much used. They then have to be renovated at considerable expense. The visible rays do not alter, but ultra-visible rays may not be present at all, after long use. The life is said to be about 2,500 hours. but Humphreys says that in his experience they last only a fifth of this time.

Mercury vapour lamps may be used either on direct or alternating currents, although for use on the latter, an auxiliary apparatus known as a rectifier is required.

All things considered, it seems to me that the lamp which is of greatest utility to the veterinary surgeon is the tungsten arc lamp. They are similar to the arc lamps used in cinematography; the arc is open and the consumption of current is low. A universal resistance is provided for use on voltages from 100 to 250. The whole apparatus is portable, self-contained, economical and almost fool-proof. It may be used on direct or alternating current, although it is impossible to burn *pure* tungsten except on a direct current. Tungsten emanates very rich bands of ultra-violet, and although its rays are cold, they are capable of producing severe erythema if given in overdoses. Open arc lamps are much cheaper to purchase than mercury vapour lamps; the one I am exhibiting cost £20. Pure tungsten electrodes cost about 4s. per inch, but the latest substitutes, which are almost as good, are only 7s. 6d. per pair. Iron cored carbons are even cheaper (about 3s.). So that, to summarise, I advise the beginner to equip himself at first with an open arc lamp. Having mastered this, he will then soon launch into deeper realms of actino-therapy; that is, if he becomes an enthusiast and can afford to indulge his thirst for further knowledge. As a matter of fact, such an apparatus should soon be able to pay for itself, because treatment by it becomes an extra on all accounts.

Many matters have, unfortunately, had to be omitted, but I am hoping that enquiring members will have spotted which they are, and raise them in the discussion.

Major Kirk brought with him a large array of electrical apparatus which was ably demonstrated to the members and added very materially to the interest of the meeting and one's understanding of the subject. An open arc lamp was connected to the main electrical supply, and the many different specula and other components were explained. A spectroscope costing about £25 was also exhibited to show how the amount of ultra-violet present in a given light could be immediately observed. An endeavour was also made to throw some lantern pictures on the wall, but on account of the difficulty of excluding sunlight from the room, these were not easily seen. One of the special tungsten filament electric globes (costing £12) was exhibited, but not advocated as of much practical value. Special goggles, specimens of vita-glass, various electrodes, dosimeter pastilles and a few other small items completed the demonstration.



The "Arnold" Arc Lamp (Front View).

DISCUSSION.

Professor J. MCUNN, of the Royal Veterinary College, London, in opening the discussion, said: When Major Kirk asked me to accompany him to this meeting I readily agreed. I had visions of a very pleasant motor ride, followed by a visit to a beautiful old town and the company

of many old and new friends. Instead of this pleasant prospect, imagine my dismay when, having agreed to accompany the essayist, he suddenly acquainted me with the fact that I was to open the discussion on his paper.

The situation was further complicated by the fact that, as regards actino-therapy, I was quite a novice. My protestations were met with the cheery replies: "There is nothing in it, you can do it easily," and, "If someone does not start a discussion you might as well go and read a paper in Madame Tussauds." (Laughter.) Major Kirk is a pioneer, and he and a few other veterinary surgeons have, with laudable zeal, essayed to open to the veterinary profession the immense field covered by actino-therapy. A pioneer in any subject is not devoid of courage, he has to withstand the taunts, ridicule and the jealousies of his contemporaries. Actino-therapy and its promoters have now passed through this stage, and now that its power is becoming recognised it cannot fail to make great headway. Many people do not believe some of the statements made by its enthusiasts, but history is full of such cases. I have read that even the statements of Columbus before and after his great discovery were not believed to be true by many of his contemporaries.

One must congratulate Major Kirk on the lucid way in which he has treated his subject; to me it is one of the most easily understood papers on this subject that I have read.

I think that many of you will agree with me that the purely physical side of the question can only be reasonably cross-examined by an expert, and I propose to confine my queries to the purely therapeutic aspect.

I would like to ask:—

(1) What is the minimum area of body surface that has to be irradiated in order to secure a general systemic effect as in rickets?

(2) Major Kirk says that ultra-violet rays are absorbed very rapidly and become irritant, the erythema being no guide as to benefit conferred. How does Major Kirk regulate the dose? What guides does he use? Does he test the rays as a preliminary, as they do X-ray, on some photo-sensitive tinted paper and regulate the dose according to the special tint obtained under certain specified conditions as to distance and time?

(3) When burning and vesicle formation take place, is this a delayed result? If so, it cannot resemble simple burning, for the results are to be seen practically immediately.

(4) When an animal is irradiated, is there any alteration in general or local temperature?

(5) On what experimental grounds does he draw his conclusions that spores are less resistant to ultra-violet rays than to other agents?

(6) He says:—(1) Rays with wave lengths of 2900A°—3300A°. "Have no bactericidal effect." (2) "Rays of about 3000A° have probably greatest therapeutic effect, being possessed not only of powers of penetration, but of killing organisms." How does he associate these two statements?

(7) Common glass, dust, etc., absorb ultra-violet rays. What does he mean? What happens to the rays?

(8) On what grounds does an increase in leucocytes in the blood show that the patient's resistance is low? Which resistance is low—is it resistance to the rays or to some disease from which the patient may be suffering? May it not be that the patient is unaffected by ultra-violet rays?

(9) In what way did rays act on the prostate? Was it direct or indirect action? If direct, the rays used must have greater penetrating powers than the figures given by the essayist. Penetrating power must be in inches, not mm. If the effect is indirect, *i.e.*, by its general systemic effect, why not irradiate the back or chest? It would be much more pleasant for patient and operator.

(10) Does the site of skin to be irradiated make any difference to the dose given? I have in mind that in certain areas, such as the back, the skin is much thicker than, say, that of the abdomen. For general effects, has Major Kirk found any site which is particularly receptive?

(11) *Re* the effect upon the eyes. I have been told that one can get conjunctivitis by reflected ultra-violet rays as well as by direct rays. Is this so? Are animals' eyes as liable to ultra-violet ray injury as those of man? In cases I have seen, monkeys, rats and marmosets are very insensitive. I have known them to be under for 10—20 minutes without ill effect.

In regard to treatment:—

(12) Is it not a fact that, in the case of eczema, ultra-violet ray treatment, being non-specific in every case, follows on the lines of all other medicaments used in that disease?

(13) What general and local treatment does Major Kirk employ in conjunction with the rays? May not some of the success be due to these?

(14) Has Major Kirk seen any recurrence of symptoms after an interval, or are the cases completely cured?

(15) In alopecia: How long has one to persist and not lose heart—weeks, months, or years? Major Kirk is a bad advertisement. (Laughter.)

(16) X-rays only kill hair in ringworm cases when the dose is not regulated. This is the case in which the tinted paper method of dosage was evolved.

(17) In Russell's case of sarcoptic mange in the cat, was diagnosis qualified by the finding of the parasite?

(18) Is it not a fact that there are quite a number of lesions of the skin—papular, urticarial and lichinoid conditions, which are directly caused by exposure to the sunlight and aggravated by actino-therapy?

(19) Are all the good results in healing of skin lesions treated due to ultra-violet rays? I have in mind that in small pox the best results, without scarring, are obtained by keeping the patient in the dark.

(20) Has Major Kirk any remarks to make as to the effects produced in animals of different colours and with or without skin pigmentation?

(21) Lumbago can quite often be cured by one ten-minutes' period of massage with a hot flat-iron.

(22) How does Major Kirk direct the light into the dog's ear? It could not penetrate cartilage or bone.

(23) Why is actino-therapy contra-indicated in amyloid disease? Does not amyloid depend upon some chronic infection which, if localised, would no doubt be benefited by actino-therapy?

(24) Has Major Kirk any information to give us as to effects upon the genital system? X-ray and radium will make an animal sterile. (Here Professor McCunn read an extract from the *North American Veterinarian*, of December, and which appeared in the issue of the *Record* for April 30th).

Mr. Mason, who is the manager of the electrical department of Messrs. Arnold's, Ltd., has kindly supplied the following observations:—

The uses of ultra-violet would appear to be not only interesting to the veterinary surgeon from a treatment standpoint, as the field of usefulness has latterly increased to a very considerable extent. We have all heard of the sterilisation of milk by this means, but it is only lately that this has become practicable by means of new inventions and increased efficiency of appliances. Milk irradiated by ultra-violet not only becomes sterilised but has a definite increase in Vitamine A.

At a London clinic where babies are treated under the auspices of the London County Council, the matron remarked that although the children improved under the treatment by ultra-violet, the work was hindered considerably by the fact that the mothers in a great number of cases were unable to feed their children. It was suggested to her that it would be advisable to radiate the breasts of the nursing mothers, and this was arranged by getting the mothers to hold the babies in their laps under treatment and exposing their breasts at the same time. The matron reported that the result was simply marvellous, that in practically every case a full supply of milk was obtainable.

Acting on this information, a farmer in the Home Counties experimented with his cows. For some time before they calved he radiated the udders and the under part of the body from both sides every day. The calves

were all born in a fine healthy condition and the milk supply was increased by 25 per cent. He also carried out some experiments with newly-born pigs, starting giving them sunlight treatment from the very first day, with the result that he was able to get his pigs to market six weeks before his neighbours.

Experiments are now being carried out by a well-known veterinary surgeon on the treatment of sterility in mares, and in racing stables the treatment is now used to develop the growth of the two-year-olds for racing. purposes.

There is no doubt that continuous investigation and experimental work will lead to an enormous development of the application both of ultra-violet and the invisible infra-red radiation both for veterinary and for farming purposes.

Gentlemen (concluded Professor McCunn), I am now at the end of my catechism, but I cannot close without again congratulating Major Kirk. His paper is good, but he has gone further than others have—he has brought from London the various types of apparatus which he and others use in actino-therapy. He is going to show us these things in action and if you pay as much attention to the demonstration as you have to his paper, I am sure that he will consider himself amply rewarded for all the trouble and care he has taken in the presentation of the latter.

Colonel F. S. H. BALDREY congratulated Major Kirk on his most informative and interesting paper. He wished to emphasise the question which had been asked as to the area of the body surface which had to be irradiated in order to secure a general systemic effect—he was still in doubt as to how the rays got into the blood. They had heard that their penetration was very short and how they were held up, as it were, by the epidermis; then how could the blood be influenced to the extent necessary to produce the beneficial effects which had been stated to follow the use of ultra-violet rays in rickets?

He also desired to be informed as to the effect of the irradiation of food stuffs. Could the process be applied to solid foods, such as oats, beans or hay? He knew that it was practised in regard to milk. He himself used the tungsten lamp on a dog which had had twelve exposures, the maximum duration of which was five minutes, and after the last exposure an ulcer appeared on the back, despite the fact that the direct rays had all fallen upon the chest and abdomen, and that the back could only have been subjected to the effect of oblique rays. Would it be advisable to apply the light to that ulcer as it now existed?

Another member asked what treatment should be adopted for burns produced in this way?

Mr. R. MOORE remarked that most of Major Kirk's experiments seemed to have been made upon dogs, but he would very much like to know if the essayist thought that the rays could be usefully applied to two diseases of great concern to them as country practitioners, namely, grease, and "its brother," canker? He suggested that the essayist should treat a case of grease in this way and advise them as to the result; if it was successful, he had no doubt that a few of them would be inclined to adopt the treatment.

Mr. A. S. ADAMS expressed his appreciation of Major Kirk's excellent paper and said that he had noted that ultra-violet irradiation of the udders of cows increased the milk supply. In what ratio was the cost of such irradiation to the cost of the supply of milk at 10d. a gallon? (Laughter.)

Mr. J. R. BARKER expressed the view that it was possible to explain the effect upon a local ulcer produced by systemic irradiation on the basis of McDonagh's work. The beneficial effect of X-rays was supposed to be produced by the aid of the colloid protein particles of the blood which took up the electrons from the X-ray. In that way, the electrons might be carried to the ulcer. That might also explain the beneficial action of ultra-violet ray therapy in rickets. It might not be direct; it might be due to the colloid protein particles having their electronic content increased. The point about ringworm was very interesting; his two children were unfortunate enough to contract that affection and all other remedies known were tried without success. Eventually the affected places were submitted to the action of the X-rays. They denuded the children's heads of hair, but they killed the ringworm, and the hair grew again in a normal manner.

A MEMBER asked the essayist as to the effect of the rays on paralysis in dogs.

THE REPLY.

Major KIRK, replying to the points raised in the discussion, said that the number of questions asked almost necessitated the writing of another paper if they were to be dealt with adequately. At the outset he desired to express his sincere thanks to Professor McCunn for coming down to Bath and helping him out of the difficulty in which he had been placed owing to the fact that he had, almost at the last moment, been acquainted by telegram with the inability of another gentleman to fulfil his promise to open the discussion.

Dealing first with Professor McCunn's somewhat formidable series of questions. Concerning the minimum area of body surface that had to be irradiated in order to produce a systemic effect, he would allude first to that which obtained in human practice. The systemic irradiation of the human being was arranged so that the whole body, or as much as possible of it, was exposed. One did not, however, expose a large area at the outset, because it was necessary to ascertain in each case a patient's susceptibility to light. Individuals undoubtedly possessed such susceptibilities, which in some cases were so great as to become idiosyncrasies. The ill effects of overdosage were sometimes very severe, and small areas were exposed at the commencement for minimum periods. For systemic irradiation of dogs he exposed the sterno-abdominal surface which usually was either clipped or shaved. His object then was not to treat the skin but to get the ultra-violet absorbed into the blood stream.

In answer to question 2, which concerned dosage and how it was regulated, Major Kirk said that in order to be on the safe side one should commence with a minimum dose, say, of one or two minutes, and gradually work up until a definite reaction was observed. The reaction would be of the 1st, 2nd, 3rd or 4th degree, and one would have noted how many minutes were required, with what type of lamp it was produced and at what distance the patient was from it. He found that exposures under about eight minutes did not often produce visible reaction in dogs, and so he had come to more or less start off with a dosage of five minutes at one foot distance, increasing the time with each exposure. He had a dog only the previous day that had a patch of alopecia on the side of the chest and the area was very red and pimply, but there was no irritation. He gave it ten minutes exposure to iron cored carbon and that produced just a nice second degree reaction with slight exfoliation. which one aimed at producing. He thought it was always desirable to shave the area to be treated, whenever possible, for the better penetration of the light and better to observe its effects. If it was desirable to irradiate animals which could not be shaved, such as cows or cats, longer exposures must be given, as must also be done if the lamp is placed further away from the subject. There was no law in such matters; one had to find out by experience. He had often wondered whether the hairs themselves were able to absorb the rays—pass them down their nutrient canals to the bulbs, there to be taken up by the blood.

He did not personally test the rays on photo-sensitive paper, but it could be done, and he exhibited a box of what were known as "Ultra-Violet Pastilles"—a contrivance designed to measure the ultra-violet output of a given arc, or to ascertain the dosage suitable for individual patients. The outfit, briefly explained, consisted of white pastilles which were sensitive only to ultra-violet rays, and if they were exposed for a given time to such rays they would discolour so as to approximate some one of a series of coloured pastilles which were numbered according to a scale of reaction. A very convenient instrument for registering the time of exposure was the "*exposure meter with alarm*

bell" which he had brought to show the meeting. For use, the hand on the dial was set at the requisite number of minutes, the clock set in motion and the risk of forgetting the time was thereby eliminated as the bell rang upon expiry of the time indicated. As a general rule, acute cases had small doses and chronic, large.

Exposure Meter with Alarm Bell.

Burning, as a result of the over application of U.V.R., was a delayed result. That was where it differed from mechanical burning and burning by acids and fire. It took place—if at all—after a latent period of anything from four to eight hours.

In regard to the effect of irradiation upon general and local temperature, if one gave a marked overdose one might considerably increase the temperature of an animal; and if one produced erythema without systemic effect, there would, of course, be an increase in local temperature.

Concerning Professor McCunn's fifth question, he had made no experiments upon spores himself, but in studying the observations of those who had, he had read that spores were far less resistant to U.V.R. than to chemicals.

Question 6 dealt with an apparent contradiction in his paper in that he had stated that whilst rays of wave lengths between 2,900A° and 3,300A° had no bactericidal effect, the rays of greatest all-round value were those of about 3,000A°. The facts were these: It had been proved by experiment that the wave lengths of greatest germicidal value were those between 2,000 and 2,900 and had poor penetrative powers; the rays of wave lengths between 2,900A° and 3,800A° had marked penetrative power but *little* bactericidal power. The rays of 3,000A° were therefore about midway and possessed some of both qualities, and consequently were regarded as of the greatest general value therapeutically. One did not always wish for bactericidal power such as would be needed in treating lupus; nor did one always want to produce deep penetration and systemic effects. The type of lamp employed, or the kind of electrode burnt in it, would therefore be decided according to the disease one contemplated treating.

He had next been asked in connection with the statement that common glass, dust, grease, etc., absorbed the rays, what happened to them? He could not say exactly where the rays went, but he knew they were entirely lost or absorbed.

Professor McCunn: What do you mean by "absorbed"?

Major Kirk, in reply, said that if he put one of the pastilles behind a dirty piece of glass and another behind a piece of clean vita-glass and exposed both to the arc, that on the vita-glass would colour up, whereas the pastille behind the dirty glass would be scarcely coloured at all. It was therefore obvious that the U.V. ray was not getting through. Perhaps the ray was absorbed in the substance of the glass; perhaps in the film of dirt, but further than that he could not explain. X-ray, on the other hand, was stopped by very few materials. Serum very readily absorbed ultra-violet rays and it was proved that that was the mechanism by which hæmolysis of red blood corpuscles was prevented.

Professor McCunn had suggested that a patient, though showing an increase in the leucocytes of the blood, might not possess a low degree of resistance to the rays, but to the disease from which he was suffering, it being unaffected by the rays. In answer to that he would say that if they irradiated a patient systemically and could not increase the development of leucocytes, that showed that the patient's resistance to disease was low. Of course some individuals would be found who were little affected by light, but that would not be the general rule.

Concerning the ability of the rays to affect the condition of the prostate, he applied them to the perineal region because he wanted to produce a local reaction in the region surrounding the prostate. He produced a severe erythema and he thought it was that, combined with absorption, and perhaps with some other hidden effect, which yielded the beneficial results. He thought that hyperæmia should be produced as nearly as possible to the vicinity of the lesion, though he was convinced that a patient would benefit largely by receiving only a general irradiation. The fact that a hyperæmia occurred, facilitated the absorption of ultra-violet by the blood in the region which was most affected. In addition, one should not forget the sedative effect on nerve endings, which could be produced locally.

As regarded question 10, Major Kirk said he knew nothing of that from his own experiments, but, from notes taken at a course of lectures which he attended, the following order of sensitivity for the human being had been worked out: chest, 1; abdomen, 1; back, 1¼; groin, 1½; anterior arm, 1½; post arm, 1¾; post leg, 1¾; anterior leg, 2; back of hand, 5; palm of hand, 15; and soles of feet, 25.

He did not think the degree of sensitivity was so much a question of thickness of the skin as it was of whether that skin was normally exposed to light. Probably the vascularity of the skin was as of great importance as any factor.

It was certainly the case that conjunctivitis could be caused by reflected ultra-violet rays as well as by direct rays. Snowblindness was caused in that way, and was an example of the effect of U.V.R. reflected from crystals of ice. He had never ascertained whether animals' eyes were as liable to injury from the rays as were those of man, because in order to discover that he would have had to expose an animal to the risk of a severe attack of conjunctivitis. He had, therefore, always protected his patients' eyes; but his office cat habitually looked on at the proceedings and had so far not exhibited any deleterious effect upon its eyes. He himself found that a very brief observation of the arc with the naked eye was productive of a distinct pricking sensation around the edges of the eyelids.

In regard to eczema, if he was treating that by ultra-violet irradiation, he gave no other treatment. It was not advisable to apply ointments or other dressings in such circumstances, as these tended to prevent the penetration of the radiation at subsequent exposures. Grease of any kind absorbed or stopped the rays, and its use would necessitate cleansing with spirit before irradiation.

As to the recurrence of symptoms, he was bound to say that cases did sometimes recur after apparently successful treatment, and he had himself instanced a case of otorrhœa in which recrudescence took place after what appeared to be a perfectly wonderful cure.

In alopecia the advice of the doctors was that one required no less than twenty-four exposures, each after a definite reaction had been produced. For his own scalp he went up to six only, and then thought he could not be bothered with it any longer.

Concerning ringworm, that had also been the subject of observations by Mr. Barker, who said that treatment by X-ray, though effective, had taken all the hair off his childrens' heads. The present method was, in many cases, not to use X-ray, but ultra-violet, which would cure the ringworm without bringing the hair off. The efficacy of X-ray therapy consisted simply in the mechanical removal of the fungus—which was not killed by the rays—with the diseased hairs.

Reference to question 17, he found it hard to believe that sarcoptic mange was ever cured by actino-therapy alone. Russell made no mention of isolating the acarus in diagnosis.

Replying to question 18, he was not aware that normal sunlight would induce the affections mentioned by Professor McCunn, although of course it was common knowledge that *overdoses* of strong sun or of ultra-violet irradiation would set up erythema, dermatitis or even vesication. Everything was harmful if overdone. Professor McCunn suggested that the skin lesions of smallpox were treated best by darkness and that light was irritating and caused scarring. He (the speaker) had not studied the treatment of smallpox, but he always thought scarring was due to rupture of the pustules and scab formation. The rupture was, in most instances, traumatic and not due to light.

Major Kirk had not observed that the different colouring of animals had of itself had any effect upon the results produced by the use of U.V.R., but thought it was said that red-headed people were much more sensitive to the action of U.V.R. than were dark people.

To introduce light rays into the depths of a dog's ear one could employ curved quartz applicators if using the mercury vapour lamp, or could use a speculum [exhibited] in conjunction with a tungsten lamp. No attempt would ever be made to penetrate bone or cartilage. He was not certain why ultra-violet irradiation was contra-indicated in amyloid disease, but believed such was the case.

Replying to Colonel Baldrey, the essayist said that the employment of U.V.R. was of benefit in rickets because it increased the Ca. and Ph. content of the blood. The deficiency of these substances, which was characteristic of rickets, was also the reason why, in treating rickets, he combined with light treatment the administration of parathyroid and calcium lactate. He did not know what had been done in regard to the irradiation of such food substances as hay and oats, but, as Colonel Baldrey had said, milk had been irradiated, and he saw no reason why many other substances should not be subjected to the process. He thought that if the lesion on the dog's back, mentioned by Colonel Baldrey, was a burn caused by ultra-violet, the further application of the same ray might only be adding fuel to the fire.

Such burns were treated more or less as were those arising from heat, *i.e.*, by the application of olive or carron oil, zinc or calamine ointments, etc.

In reply to Mr. Moore, Major Kirk said that "grease" was one of the last diseases upon which he would think of using the rays, on account of the filthy discharges, which would have to be got rid of before a start could be made, and if all the therapeutic rays were not to be blocked out. But, of course, with this proviso, it was worthy of trial, for it was only by trial that any progress could be made. The grapes of grease were dense fibrous tissue and he was very doubtful of any useful result.

In connection with Mr. Barker's allusion to McDonagh's work, he had not read it, but seemed to be vaguely familiar with some such theory as that enunciated by Mr. Barker.

Finally, answering a member's query as to paralysis, Major Kirk said he had not tried the treatment in this disease, but had pinned his faith to strychnine combined often with galvanism or faradism. A very fair percentage of cures had been effected in this way. Stainton had said that those cases upon which he employed U.V.R. for paralysis had done no good.

The essayist expressed his appreciation of the manner in which his paper had been received, and proceeded then to demonstrate the various electrical apparatus which he had brought with him.

Army Veterinary Service.

London Gazette—War Office—Territorial Army.

May 31st.—Capt. T. W. M. Cameron to have precedence as from July 15th, 1921.

CLINICAL AND CASE REPORTS.

Bovine Tetanus.

By J. H. M. Hughes, M.R.C.V.S., D.V.S.M., Oswestry.

While keeping in touch with veterinary literature of the past few years, I found cases of tetanus in bovines seldom if ever recorded, doubtless due to the rarity of the condition. On that account I made a minute study of the following case with the intention of allowing my fellow practitioners to benefit by it.

Subject.—A 14-months'-old cross-bred heifer, in rather poor condition, which was wintered outside.

History.—The animal had been slightly lame in one hind limb for a week, but was otherwise healthy in appearance. On 22nd April, the owner noticed she was stiff in the hind quarters and did not clear up her feed as usual. He diagnosed a chill and compounded a dose of salts, treacle, etc. On administering it, he found her jaws stiff in action and had difficulty in inserting the bottle. On the same night the animal became tympanitic, with accompanying short breathing. On the morning of 23rd he requested attendance as no improvement was in evidence.

I visited the farm in the forenoon and made an examination of the animal with the following results. Temperature 100°F., pulse 48, respirations 20. The heifer stood with hind limbs rather far apart, nose poked out and eyes staring, with some exophthalmos. Slight tympany of the rumen was present, which was said to have abated from the previous night. On being released into the yard she ran with stilted gait and showed evidence of impairment of vision. Salivation and grinding of the teeth were noticed. On turning my attention to the jaws I found them very firm and applying severe traction I could only draw them apart about ¼in. The tongue was flattened against the palate, giving the owner the impression it was too large for the mouth. The muscles of the hind limbs were rather rigid. A degree of constipation existed and urine was voided in small quantities and often. Just prior to my visit the heifer drank some water and appeared anxious to eat but was mechanically impeded. The cause of the before-mentioned lameness was a small sore on the hind heel. I gave a diagnosis of tetanus, with grave prognosis. For economic reasons I discarded serum treatment and as palliative measures I prescribed laxatives and liniment for the jaw, with quietness and milk and egg diet. The wound on heel was cauterised. On the 24th the heifer was reported worse, so I again visited the place. Temperature was then 102°F., pulse 108, respirations 42. Animal was very much distended on the left flank and obviously in pain. The other symptoms were as before and, in addition, stiffness and quivering of the tail were noticed, with some degree of abduction. I punctured the rumen, released the gas and injected some chlorodyne, ol. terebinth, ac. carbol and ol. lini through the cannula.

On 25th I called to see her, when the temperature was 102.8°F., pulse 84, respirations 32. The trismus was slightly better and the animal picked a little fresh grass and drank a fair amount of milk and eggs.

On 27th at the request of the owner I saw the heifer and found her very distressed owing to tympany. Tempera-

ture 103.6°F., pulse 108, respirations 48. I again tapped the rumen and injected a fairly large dose of the above-mentioned medicines.

On 29th the animal seemed much better and jaws were more relaxed. Twitchings of the triceps muscles were noted on this visit.

The following day she was reported to have eaten a considerable amount of grass and was chewing the cud. Gradual recovery took place until, on the 3rd May, the owner reported her well and was quite charmed with her progress as he had given up hope entirely.

This case had, in my opinion, a lucky termination, having regard to the length of time the very marked trismus existed. The treatment adopted was purely expectant except for the active measures taken to reduce tympany. The symptoms differed markedly from those in the horse, in which one so commonly meets tetanus. There was no marked reflex irritability, nor was there any protrusion of the membrana nictitans over the eyeball on raising the head, and the neck was as mobile as is usual.

I take it that the origin of infection was the small sore on the heel, which differs from the few cases recorded where infection was supposed to have taken place through parturition. Another point worthy of notice is the gradual rise in temperature from 100 to 103.6°F.

Cases Illustrative of Equine Endurance.

By H. A. Idenden, M.R.C.V.S., Senior Veterinary Officer, Trans-Jordania Frontier Force, I'raq.

Perhaps the following three cases, illustrative of endurance in horses, coming under observation during military occupation of I'raq by this Force, may prove of interest to readers of *Veterinary Record.*

(*a*) A small, undersized, badly-bred chestnut Arab mare, four years' old, with a bullet wound in the upper region of the near cannon bone, barely missing the knee, the bullet having traversed the bone from side to side. This mare had been ridden dead lame, by a Druse, out of action in Syria for a distance of 40 miles, and over a road consisting of large basalt boulders for many miles, and through the night. She was seen the following day after a period of twenty-four hours from being shot, and the wound was cleaned and bandaged. Wound is now doing well, but the mare will have a permanently stiff knee.

(*b*) A starved, small, grey stallion, three years' old, literally a bag of bones, with two machine gun bullet wounds in off hind leg—shot from behind. The upper wound was above the stifle, the bullet passing in a forward direction through the muscles of the quarter to be lost in those of the flank; the lower wound was mid-way between stifle and hock, the bullet circling round the bone to be embedded in the muscle clothing the inside of the leg. This horse was ridden a similar distance, over the same terrain; wounds seen and dressed two days after occurrence, and now doing well.

(*c*) Fifteen years' old, big, grey Arab mare in good condition, with knee spavin, the size of half a small Tangerine orange, inside near knee and permanently lame from stiff knee due to mechanical interference with action of joint—regularly ridden by Druse owner.

(Continued at foot of next column.)

TRANSLATIONS.

The Treatment of Metritis in Small Animals with Vaporised Iodine.

By M. S. Inglej and M. S. Terlikowski.

The classical therapy of uterine infections consists in repeated irrigations of the cavity of the diseased organ with various antiseptic solutions (potassium permanganate, dilute oxygenated water, solutions of alkaline hypochlorites, iodised water, etc.). Some authors recommend also the use of antiseptics in powder form (dermatol, iodoform, tannoform) by insufflation, or enclosed in gelatine capsules the dissolution of which liberates the powder, which then spreads over the surface of the mucous membrane of the uterus.

In reality, these remedies, the efficacy of which can be understood in the case of large animals, are frequently inoperative in the bitch or the female cat. In these species, the horns of the uterus are long, narrow, winding, and often constricted in parts; the antiseptic liquids, and still less antiseptics in powder form, do not reach their anterior extremity, even if the hind quarters of the patient are lifted up at the time of injection. On the other hand, the stagnation of antiseptic solutions in the sloping parts of the uterus may (in rare cases it is true) if the antiseptic is badly chosen, bring about accidents of intoxication. In fact, the cure of acute or chronic metritis is so uncertain that, too frequently, one must fall back on hysterectomy which, in spite of the improvements made in its technique in recent years, still remains a dangerous operation.

We have tried to render the uterus aseptic by means of vaporised iodine, which has long been used in human medicine in the treatment of wounds. We were at first able to assure ourselves that by this method, owing to distention of the womb with insufflated air, the mucous membrane of the uterus is impregnated with iodine to the very end of the horns. In a bitch on which we tried this method, and which was sacrificed immediately afterwards, it was possible, by the usual reaction, and notably by the use of starch, to show the total impregnation of the endometrium, while the same test, made with 1 per cent. Lugol's solution, showed that the Lugol's solution reached only a few centimetres beyond the beginning of the uterine horns.

For obtaining antiseptic vapours we used a test-tube containing metallic iodine, in the proportion of 2 or 3 centigrams for every kilogram of body weight. This tube is closed by a cork stopper through which are passed two glass tubes; one is connected with a thermocautery bellows; the other communicates, by means of a rubber

(Continued from previous column).

Two other points also strike one forcibly on this Frontier area—

(a) The extreme old age of the mares ridden on campaign and bred from, all being either in foal or with foal at foot—twenty to twenty-five years of age.

(b) The undeveloped stallions similarly ridden at three years' old, but naturally all showing signs of hard wear.

tube, with a tapering cannula of carefully polished glass. The test-tube is cautiously heated over a spirit-lamp; when the violet vapours begin to come off, the cannula is introduced into the uterus of the bitch, which has previously been put in position, and the bulb of the bellows is worked until the iodine is completely volatilised; care is taken to move the cannula very slightly from time to time so that the antiseptic is diffused over the whole surface of the wall. It appeared to us advantageous to precede the first insufflation by an abundant irrigation with boiled water.

The method which has just been described was applied to eleven animals (nine bitches and two female cats). Some of them suffered from a purulent discharge which had been observed for more than four months. In all, the neck of the uterus was sufficiently dilated to allow of the easy introduction of the cannula without hysterectomy. In two cases, the mucous membrane of the vagina, congested and swollen, showed large ulcers near the urethra.

In the majority of cases observed, the general condition was fairly good; four of the patients were very thin and depressed; they had no appetite; the temperature was 40°, or higher.

The first insufflation is regularly followed by a remarkable improvement in the general condition, which is, however, less marked in the worst cases; the temperature curve falls to normal; appetite returns; the patients are livelier; the discharge loses the abominable odour which sometimes characterises it, and diminishes considerably. The insufflations are renewed every two days until complete recovery is obtained—generally between the eighth and fourteenth days.

We have never observed the slightest signs of intoxication; nevertheless, we wished to know if the iodine thus vaporised was absorbed by the mucous membrane of the uterus, or passed into the urine; the reaction with chloroform and with nitric acid regularly gave a negative result.

The consistently good results we obtained by the use of this remedy, to the exclusion of any other treatment, local or general, as well as its simplicity and innocuity, justify us in concluding as to the real superiority of treatment with vaporised iodine over other methods of treating metritis in small animals.

[*Ex. Revue Générale de Médecine Vétérinaire*, May, 1927.]

R. L. HIGGINS.

Mycosis in the Hen.

By C. TRUCHE, Laboratory Chief in the Pasteur Institute.

Since I took up the study of avian pathology, it has sometimes happened that, after negative examination of the feet of birds sent to me for diagnosis, I have had whole carcases sent in order to discover if the case was not one of some disease other than typhoid or cholera.

How great was my surprise to find in certain of these birds, sometimes the pectoral cavity, sometimes the abdominal cavity, or occasionally both, covered with a fine greyish membrane enveloping all the organs.

Finding nowhere a description of such lesions, I thought of aspergillosis, but a careful examination of the air sacs and of the different organs, and a search for the aspergillus, did not allow me to conclude the presence of this affection.

In his report on "Aspergillosis in Turkeys," Lucet insists, in particular, on the pseudo-tuberculous aspect of the lesions, particularly in the liver. He describes the foci which cover the parenchymata as symptomatic of the affection.

In 1914, Darmagnac and Barlette made a communication to the Central Society of Veterinary Medicine on a case of mycosis in turkeys, but, like Lucet, they note the foci distributed on different organs, which seems to indicate they have had to do with an affection very closely allied to aspergillosis. The disease is relatively rare, in France at least, since I find hardly ten cases a year. It appears in the form of small enzootics localised in a definite poultry yard without any tendency to pass to neighbouring yards.

Symptoms.—The birds, which had been in good health before the attack, become melancholy, dejected, lazy, and move with difficulty. The feathers stand up slightly, and even fall out in certain cases. Thirst is keen, and the appetite quickly becomes capricious. Food material remains a long time in the crop, almost as in ingluvial indigestion.

The fæces become hard, moulded, and are expelled irregularly.

The patients drag on for a fortnight, the crest becomes dull, cachexia appears, showing itself in the wasting of the pectoral muscles, and the hen succumbs quietly, without convulsions, almost without a struggle.

Another follows, and the mortality continues, in this way killing off one-third or one-fourth of the whole number.

Certain birds, after some pathological symptoms, recover, and the disease disappears, leaving no trace.

Up to the present, I have observed this disease only in the hen; I do not know, therefore, if these birds are naturally susceptible.

Lesions.—Exteriorly, the carcase shows few alterations, especially if the course of the disease was rapid; cachexia is pronounced only in those cases in which the disease was prolonged. In any case, emaciation is much less marked than in tuberculosis or sarcomatosis.

On *post-mortem* examination, we generally find the liver covered with a fine greyish membrane, more or less adherent to the parenchyma, marked here and there with bright, nacreous spots. The mesentery is covered in the same way, but the colour is darker, almost leaden-grey, without bright spots. The intestine, the gizzard, the kidneys, the testicles or the ovaries present the same appearance, giving, however, an impression of dryness, contrasting with the moist condition habitual in the abdominal organs.

The abdominal is the most frequent form of the disease, and when it occurs, the lungs and the heart frequently show no sign of infection.

The pectoral form is characterised, in particular, by lesions of the pericardium. The heart is completely enveloped in a whitish pericardial sac much more pearly than in the abdominal form. The bright spots are more numerous, and very close together, and there is a marked thickening of the serous membrane. The lungs are covered with the same membrane, which can with difficulty be separated from the subjacent tissue. The crop is sometimes empty, sometimes contains a mass of food material.

No sign is found in the gizzard, and sections of the different tissues reveal nothing particular, either microscopically or macroscopically.

Causal Agent.—On examination on a slide, a few mycelian filaments alone are observed, with a few large cells, without asci or spores, or at least I have not seen any. Taking with a platinum loop a portion of the false membrane, for preference the bright spots, and cultivating it on Sabouraud's gelose, or on carrot, a culture is sometimes obtained, but with difficulty.

When it is kept for a fortnight or three weeks in a cupboard at the ordinary temperature or in an incubator at 22°, small, whitish spots are seen to appear which afterwards proliferate fairly rapidly. The culture is generalised on the medium in the form of greyish-white masses, corrugated and rough, and it gives forth, when the tube is uncorked, a characteristic odour.

The cultures, like the lesions, differ essentially from those described by Lucet or by Darmagnac and Barlette. The latter easily obtain series of cultures on all the usual media : bouillon, gelose or gelatine, recognising however, a special facility of growth on Sabouraud's medium. The lesions recognised by them consisted of whitish foci situated at the surface or in the depth of the organs.

These granulomata, sharply defined, varying from the size of a lentil to that of a pea, presented no inflammatory aureole. They assigned this yeast provisionally to the Saccharomyce class.

In a supplementary note, they pointed out that they found this affection much later in Minorca hens with the same characters as in turkeys.

Personally, not being at all competent in this matter, I asked my colleague, Dr. Magrou, to identify my culture. He assured me that it belonged to the species *Nocardia dassonvillu*, which had not yet been observed in birds.

Successive cultures in series are made very easily, and much more rapidly than the original culture.

What is the exact pathogenic function of this agent in the disease ? I confess I have not been able to establish it up to the present.

The culture, ground fine in a sterile mortar with physiological saline solution, gives an emulsion which, when one cubic centimetre of it was injected into a vein of the rabbit or the hen, did not reproduce the disease.

No result was obtained either by the subcutaneous method, at least in the few experiments I made.

By ingestion, whether forced or mixed with food, I had no better success, and yet it is a fact that the disease shows a certain contagiousness, since it spreads, rather slowly it is true, in a given poultry yard, killing a fair number of victims.

We are, then, reduced to hypothesis to explain the dissemination of the disease. I incline to think that it is a case of infection by the digestive organs by means of spoiled grain, mouldy straw or hay ; experiments, which are only at their beginning, will perhaps confirm this suggestion.

Treatment.—If the etiology and the pathogenesis of the disease are difficult to state precisely, the treatment, on the contrary, is of the simplest. Remembering the treatment of actinomycosis or sporotrichosis, I thought of using the heroic remedy in the circumstance, potassium iodide. Luckily, a cure was obtained in every case, except in those very badly attacked.

I prescribe for the patients, every morning for eight to ten days, a teaspoonful of a 4 per cent. solution of potassium iodide, which is administered either with a spoon, or preferably with a syringe without a needle. To the other birds of the yard I prescribe to be given systematically as a drink for three weeks, the same solution, but of 0·4 per cent., to the exclusion of any other liquid.

The results are encouraging, and it is to be wished that all other avian diseases could be treated as easily. Only the very bad cases continue to succumb the first days after treatment, and everything is quickly normal again. Here, too, potassium iodide, that precious remedy, shows itself specific, and the treatment is wonderful. This, then, is a new disease, of which the mode of contagion escapes us for the moment, but in which the treatment acts with practical certainty.

It is true that my researches are still very few, and it is above all to stimulate more competent seekers than myself to pursue and perfect them that I wished to communicate my observations.

(*Ex Recueil de Médecine Vétérinaire*, Nov., 1926.)

R. L. HIGGINS.

ABSTRACTS.

Spots in the Tapetum and Coloboma of the Pigment in the Horse's Eye.

(G. H. BALOGH, Inaug.-Dissertation. *Közlemények az összehasonlitö élet-és körian köreböl.* 1925. XIX. S. 75).

According to the results of examinations on 500 living horses and on 250 eyes of slaughtered horses, bright spots are found in the tapetum nigrum of the horse's eye in 9 per cent. of cases ; further, in 2 per cent. to 3 per cent. of cases, brighter bands are radially disposed round the pupil.

In the eyes of living horses, the spots appeared of the same colour as the tapetum lucidum, while in 6·8 per cent. of cases they appeared ivory white, brownish-red, brown or greenish-yellow. Moreover, in the same eye they were sometimes represented in several varieties of colours, without producing visual disturbances. They were caused by scanty pigmentation of the retina in the respective places, while in fact white spots in the region of the tapetum nigrum can only come from coloboma of the retina and the choroid. The brown, reddish-brown, and greenish-brown coloured spots in the region of the tapetum nigrum are usually the results of a simultaneous poverty of pigment in the retina and the choroid, while a genuine difference of colour in the irides occurs only exceptionally.

[Ex. *Prager Archiv. fur Tiermedizin.* May, 1926.]

E. H.

Grooming of Horses by Machinery.

(Dr. FRITSCH, *Zts. f. Veterinärkunde.* Vol. 39. 1 Jan., 1927.)

After giving a resumé of previous attempts to groom horses by machinery, the author describes experiments

carried out with three machines: the "Electrolux," the "Protos," and the "Flex," at the Militär-Lehrschmiede clinic in Berlin, over a period of two months. The first two were worked by suction and the third by a rotatory action of the grooming brush. All three needed electric power. It was found that the "Electrolux" was only useful for absorbing superficial dirt; a thorough cleansing of the skin was impossible, and it was useless when applied to the head and limbs. It had the advantage of being light in weight, but tended to slide off the back of the person using it when a stooping position was necessary.

The "Protos" had a good suctional action, but here, again, although grooming was satisfactory from the standpoint of superficial cleanliness, it did not satisfy hygienic requirements. Although heavier in weight then the "Electrolux," it was more convenient to use because it could either stand in the stable or be firmly fixed into a basket if it had to be carried.

The "Flex" was more efficient as a cleanser, not only for the body but also for the head and legs. The action approached most nearly to that of hand grooming, and the horses enjoyed the process. The drawbacks to the use of this apparatus were that the revolving brush polluted the air of the stable and made the grooming an unhealthy business for the man who performed it, and that as the weight of the machine was considerable (16·7 kg.) it took a strong man to do the work properly.

The author suggests that it would be desirable if the suctional and rotatory actions could be united and the motor could be placed in some other position than on the groom's back. The experiments were not of sufficient length to report on the durability of the machines. D. K.

NOTANDA.

To get the fullest anthelmintic action from santonin the dose should be given in the evening and allowed to act for twelve hours during the period of intestinal rest, and then purged out with castor oil or a saline hydragogue.

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The cause of urticaria in the dog is vague, but the condition is associated with the content of the digestive tract and the effect of that content reflexly upon the skin, causing the sudden appearance of rounded elevations on the surface of the body.

. . . . . .

In the dog digestive derangements are frequently reflected by skin disorders that provoke pruritus. These disorders of digestion may be due to food that is not suitable (an unbalanced ration), overfeeding, and intestinal parasitism.

. . . . . .

As early as 1824 azoturia was the subject of critical study by well-known authors. Coulbeaux and, later, Bouley pronounced the disease a spinal affection.

. . . . . .

In 1877 Bollinger announced the theory of auto-intoxication of muscular origin, a theory that has never been successfully contra-indicated to this day. According to this author, azoturia is caused by waste products elaborated from or accumulated in the enormous musculature of the hind extremities.

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Three hundred years will have elapsed in 1928 since Harvey discovered the circulation of the blood.

H. K.

DIVISIONAL REPORTS.

Mid-West and South Wales Division.

MEETING AT BATH.

There was a satisfactory attendance of the members of the Mid-West and South Wales Division at Bath on Friday, April 29th, when the chief feature of the meeting was a paper presented by Major Hamilton Kirk, of London, on "Actino-therapy in Canine Practice."

Professor J. McCunn, of the Royal Veterinary College, accompanied him from town to open the discussion, the other visitors included Miss E. G. Knight, who, as Assistant to Mr. Barker, of Hereford, paid her first visit to the meetings of the Division.

The President, Mr. J. L. Perry, of Cardiff, occupied the Chair, and there were also present in addition to those already mentioned, Messrs. A. S. Adams, C. Armstrong, G. Atkinson, Captain W. A. Austin, Mr. J. J. Aveston, Colonel F. S. H. Baldrey (visitor), Messrs. J. R. Barker, J. R. Baxter, W. T. D. Broad, G. L. Harber, G. E. Henson, J. R. Hewer, T. J. Margarson, J. W. Hall Masheter, A. Messervy (visitor), R. Moore, C. E. Perry, Major E. E. Seldon, Messrs. G. E. Pettifer, J. O. E. Powell, W. R. Watson, W. Webster, and W. D. Rees (Hon. Secretary).

The *Minutes* of the last meeting of the Division, which was the Annual Meeting, having been published in the *Record*, were taken as read and were confirmed.

CORRESPONDENCE.

(1) Letters of apology for absence from Messrs. Esmond Brown, J. C. Coleman, Howard Jones, Major Storrar and Mr. Thorburn.

(2) From the Secretary of the N.V.M.A., requesting the opinion of the Division on the following points: (*a*) Whether the time has arrived for exercising some form of control over cows that have reacted to the Tuberculin Test; (*b*) If so, what form that control should take and how far it is practicable at the present time.

The PRESIDENT said that he understood that up to date only one Society had signified its opinion that there should be some form of control; the others which had expressed opinions on the subject had taken the view that the time was not opportune.

Mr. HEWER was of opinion that the time to exercise control over reacting animals had not arrived, for the reason that the Government was not in a position to bring forward any measure of compensation, and until they could pay compensation it was useless advocating the notification of reacting animals.

The farmer was even now in a difficulty as to what to do with his reacting cows, tested for the production of "Grade A" milk, etc., and it was impossible to ask him to go further without compensation.

Mr. Hewer accordingly moved: "That, in the opinion of the Mid-West and South Wales Division, the time is inopportune for exercising control over reacting cows."

The HON. SECRETARY, who said that he was in complete agreement with what Mr. Hewer had said, seconded the proposition, which was carried unanimously. This being so, the second point raised in the letter from the "National" did not arise.

Resignation.—A letter intimating his desire to resign from membership of the Division, was received from Mr. Esmond Brown, of the Ministry of Agriculture, recently stationed at Cardiff, on account of his removal to Edinburgh.

Mr. Brown's resignation was accepted with regret.

Next Meeting.—It was decided to await the receipt of suggestions from members before deciding upon the programme for the next meeting, which is the Summer Meeting of the Division.

CONFERENCE WITH THE GLOUCESTERSHIRE COUNTY COUNCIL.

The PRESIDENT called upon Mr. A. S. Adams, Chairman of a Sub-Committee of the Division appointed to confer

with the Diseases of Animals Sub-Committee of the Gloucestershire County Council on the question of the inspection of herds under the Tuberculosis Order and the Milk and Dairies Order, to report on the results of the deliberations which had taken place.

Mr. ADAMS said that the Divisional Committee, consisting of Mr. C. E. Perry, Mr. Hall Masheter and himself, was appointed to meet the Special Committee appointed by the Diseases of Animals Sub-Committee of the County Council, upon the suggestion of the County Council.

First of all the Divisional Committee had been enlarged by the co-option of Mr. Baxter and Mr. Brain. They considered the matter of doing the work under the Milk and Dairies Act and Order separately from that done under the Tuberculosis Order. The Divisional Committee had several meetings and then they called the whole of the inspectors in Gloucestershire together to meet them.

First of all they agreed to ask for 1s. per cow to carry out work under the Milk and Dairies Act and Order. It was subsequently represented to them that the Contagious Diseases Committee of the County Council could not accept that figure, and later on they agreed to accept 1s. per cow for the following work: To carry out the duties required under the Tuberculosis Order and also those under the Milk and Dairies Act and Order so far as it related to tuberculosis; two inspections of all herds during the year and to include all mileage. One shilling per head to be the capitation fee and to include all cows in milk, all dry cows and all in-calf heifers. These were the classes of animals to be counted for the purpose of the returns. A census of these animals yielded 47,000 for the County of Gloucestershire; they thought it was a much larger figure, but they would not know for certain as to its accuracy until they had done the work for one year. If this figure was accepted, however, at a capitation fee of a shilling the cost of inspection would be £2,350. It was an absolutely experimental arrangement, and it was optional to them at the end of the year to renew it or to discard it.

The point they had before them at the time was one which was in the minds of many at the present time, and that was the question of the employment of whole-time men to do this work. The County Committee took the view that, while they desired to employ veterinary practitioners who were now carrying on the duties of part-time inspectors, they would be compelled to employ whole-time men if the expense of the former system was the greater. The correct figure for the expense of working the Tuberculosis Order during the last year—from April, 1926 to April, 1927—was £1,475, including mileage. The costs given to them for carrying out the Order as last year were £1,250, the difference being accounted for by a reduction in the scale of travelling expenses. They had, concluded Mr. Adams, done the best they could, and every inspector agreed, with the exception of one gentleman who desired to know the number of dairies in his area before he would agree, because he lived in an area where there were very few dairies. He (the speaker) had appealed to the Secretary of the "National" for guidance in this matter, and had received the advice that they should try to make the best terms they could.

Mr. C. E. PERRY said he would like to endorse all that Mr. Adams had said.

A member remarked that the agreed fees might be equitable enough in a great dairying county like Gloucestershire, but that in a county where there were few dairy herds they would mean the securing of a very poor return for the work involved.

Consideration of this matter terminated with the observation by the PRESIDENT, that he was sure that the Division wished the veterinary inspectors of Gloucestershire "good luck" in this matter.

He then called upon Major HAMILTON KIRK, of London, to read his paper, "Actino-therapy in Canine Practice." [Major Kirk's paper, together with the ensuing discussion, which was opened by Professor J. MCCUNN, of the Royal Veterinary College, London, receives separate publication in this issue.—Ed.]

At the conclusion of the essayist's reply, a very hearty vote of thanks was accorded both to him and to Professor McCunn for opening the discussion, on the proposition of the PRESIDENT, seconded by the HON. SECRETARY.

Nominations.—Mr. J. J. Aveston nominated for election as an Honorary Member of the Division Dr. Colston Williams, Medical Officer of Health to the Glamorgan County Council. The PRESIDENT seconded and the nomination was accepted.

New Members.—The following gentlemen were elected as new members: Messrs. T. S. Atkinson (Bristol), L. C. Maguire (Stow-on-the-Wold), W. C. Maguire (Tewkesbury), C. J. Pugh (Chepstow), and T. J. Reynolds (Cirencester).

Any Other Business.—Under this heading, Mr. S. H. PETTIFER brought to the notice of the meeting a question as to the use of carbon tetrachloride in parasitic gastritis. He gave 190 ewes each a single capsule containing 2 c.c. The next morning 18 of the ewes were dead and another died the morning after, while a great number were seriously affected. He thought that another veterinary surgeon had had a similar experience.

It was agreed to refer this matter to the Council of the Division for consideration.

At the close of a highly-successful meeting the company took tea together.

W. D. REES,
Hon. Secretary.

Royal Counties' Division.

MEETING AT OXFORD.

The members of the Royal Counties' Division attended in excellent numbers at the Clarendon Hotel, Oxford, on Friday, May 6th, 1927, to hear and discuss a paper by Major G. W. Dunkin, Superintendent of the Field Laboratories of the Medical Research Council, on "Johne's Disease," which formed the principal feature of a meeting held with the President, Professor J. B. Buxton, in the Chair.

In addition to those named, the following members were present: Messrs. J. H. L. Addis, J. W. Baxter, H. Bell, J. Bell, F. W. Chamberlain, Major J. J. Dunlop, Messrs. E. J. Gill, W. A. Hancock, J. R. Hewer, Major H. G. Jagger, Major T. W. Lepper, Captain W. L. Little, Messrs. G. P. Male, J. W. McIntosh, Lt.-Col. P. J. Simpson, Major F. J. Taylor, Mr. E. P. Thorne, Major C. H. S. Townsend, Major E. G. Turner, Messrs. E. Wilkinson, and F. W. Willett, together with the Hon. Secretary, Major R. Catmur.

The receipt of apologies for absence was announced from Captain W. A. Austin, Captain A. Barr, Major W. K. Barron, Dr. Dreyer, Major A. C. Duncan, Mr. C. J. N. Godfrey, Major F. T. G. Hobday, Messrs. J. McKerlie, J. W. McIntosh, Major-General Sir John Moore, Major G. Rees-Mogg, Major E. E. Seldon, Messrs. J. H. Shepherd and S. H. Slocock, Major R. C. Tennant, Mr. F. T. Trewin and Mr. J. Willett.

The minutes of the last meeting of the Division, having been published in the *Record*, were taken as read and were confirmed.

Correspondence. A letter was read from Major Henry G. Lepper, of Aylesbury, thanking the Division for the honour of the Honorary Associateship which had been conferred upon him at the last meeting.

Election of New Members. The names of the following gentlemen, whose nominations had been accepted at the previous meeting, were now submitted for election to membership: Messrs. T. G. Chamberlain, C. Elphicke, J. H. Shepherd, Major C. H. S. Townsend, Major J. J. Dunlop and Mr. E. P. Thorne.

The PRESIDENT remarked that it was very pleasant to note that they had so many names before them that day as candidates for membership. Their election, which he had no doubt would be readily made, would bring the number of members of the Royal Counties' Division up to 77, which was extremely satisfactory.

Lt.-Col. P. J. SIMPSON proposed that the gentlemen named be elected *en bloc*; he desired, at the same time, to

add to the President's remarks by congratulating the Hon. Secretary on the excellent work he had done in securing so many new members for the Society.

Mr. F. W. WILLETT seconded the proposition, which was carried with enthusiasm.

The HON. SECRETARY informed the meeting that the Council of the Division had had before them the question of the Division's participation in a meeting of the Guildford Division of the Surrey branch of the British Medical Association, and that the Council was of opinion that no further action should be taken in the matter at the moment, as no definite arrangements had been made.

A resolution from the CHAIR, seconded by Major DUNKIN, endorsing the Council's view of the matter was carried unanimously, it being made clear, however, that such action did not imply that if information was received that such a meeting was going to be held that members should not attend if they wished to do so.

Next Meeting. The PRESIDENT: Many of you will remember that at the last meeting of the Division it was suggested that the next meeting to this should be held at Cambridge. I need hardly tell you that if you so decide to-day, both my wife and myself will do our best to give you that form of entertainment which we think will be most acceptable to you, but I should be more than grateful for suggestions as to the form that entertainment should take. I do not necessarily mean purely on the social side; I take it that you would like to see the veterinary institute, and if you can suggest what features of our work you would particularly wish to have put before you we will do our very best to fall in with your wishes. (Applause.)

Several members spoke in support of the proposal to meet at Cambridge, and the meeting resolved upon that course, Lt.-Col. SIMPSON voicing the thanks of the members to the President for his invitation. It was left to the President and the Hon. Secretary to arrange the details of the meeting.

POST-MORTEM SPECIMENS.

Major F. J. TAYLOR: I have a specimen here that should be of interest to any ardent canine pathologist. The history of the case was that the subject, a Fox terrier, six years' old, had been gradually wasting away over a period of six months without exhibiting any definite symptoms whatever. The animal lay about in a very listless condition, and became very neurotic. She would suddenly wake up in a nervous manner which almost indicated the presence of internal parasites. The dog ate well and digested its food in a normal way, but immediately on drinking water emesis took place, a fact which has a bearing on the pathological sequel to the case. Various methods of treatment were tried without success, and the dog gradually faded away into a pitiably weak condition. Ultimately, I destroyed it, and on *post-mortem* examination I found that the liver, although presenting a normal appearance on the outside, contained a large number of small, white, hard growths, while the duodenum was surrounded by a white, dense growth. The kidneys were absolutely full of growths of the same character—white, hard structures. What they are, I cannot tell you, but I am having a section prepared at the histological laboratory here. Several pathological experts who have seen the specimen express the opinion that it is most probably epithelioma. Curiously enough, the spleen was quite unaffected. I may say that it was quite easy to discern the presence of that large growth in the region of the duodenum by manipulation, but I had no idea that it was so large.

The PRESIDENT: I am sure we are all very grateful to Major Taylor for bringing forward this interesting specimen. At the present moment it does not appear to me to be very like an epithelioma but, on the other hand, it well may be. The trouble that followed the swallowing of liquid is interesting because, as everybody knows, that is very often associated with an ulcer of the duodenum and also with the presence of a diverticulum of the lower portion of the œsophagus, and those are two things between which one has to try and differentiate.

Major TAYLOR, replying to a member, said that he could find no lesions in the lymphatic glands. Proceeding, he said that the case interested him particularly because some months ago a Fox Terrier, which had been in quarantine on coming from India, was brought to him exhibiting the same condition. On *post-mortem* the same appearance was presented by the lungs as was shown in the case under notice. He had sections made and Dr. Dryerre said that it was an epithelioma.

Mr. G. P. MALE: I saw, in consultation with another member of this Division, a case of tuberculosis in the horse in which the only symptoms were that he was weak and unable to do his work, and was losing condition. He was only six years' old and had been a very fat horse. We decided to have the horse destroyed and we found an enormous tuberculous growth in the spleen and another in the liver. In this case there were no cervical symptoms. This horse had had cow's milk when it was a foal. I had another case in a stallion that had also had cow's milk when he was a foal: here again the spleen and liver were involved, but in this case there was no neck stiffness. The stallion was twelve years' old.

Major TAYLOR exhibited an instrument which he designated a "combined castrator," which comprised a scalpel, a longitudinal compression forceps and a pair of scissors. The method of use was to open the scrotum in the ordinary way, tense the cord by traction and compress it, then sever the structures beyond the point of compression.

Lt.-Col. P. J. SIMPSON: I am extremely sorry that I have not a specimen with me which I think would have been of interest to the members, but I left it at the College yesterday with Professor Wooldridge, who wanted to show it to the students. It was a case of a big Chow with a fistula at the base of the neck, almost between the shoulder blades. I was asked to operate on it and I asked Professor Wooldridge to look at it for me. He examined it and operated on it yesterday. It proved to be a dermoid cyst. The channel extended the length of my little finger in a forward direction. It was dissected out and on cutting it open we found it to be a tube in which hair was growing. It struck Professor Wooldridge as rather interesting and certainly I have never seen one like it myself.

Replying to questions, Colonel Simpson said that there was no mark on the skin to indicate a previous punctured wound that might have driven the skin into that position, nor was there any question of dead hair having been inserted—it was perfectly adherent to the inside of the channel, growing there.

This concluded this section of the proceedings and the President now called upon Major G. W. Dunkin to present his paper on Johne's Disease.

[Major Dunkin's paper, and the discussion which followed, will be reproduced in a future issue of the *Record*.—ED.].

At the termination of the discussion the PRESIDENT proposed a very hearty vote of thanks to Major Dunkin for the trouble he had taken in coming to give the members the benefit of his work at such an early stage. He also wished to express his indebtedness to the gentlemen who had contributed so much to the success of the meeting by bringing forward *post-mortem* specimens.

The votes of thanks were enthusiastically accorded, as was a similar tribute to the President for his conduct of the meeting.

The members subsequently took tea together at the invitation of Messrs. Baxter, Catmur, Taylor and Wilkinson.

R. CATMUR, Hon. Secretary.

Derbyshire Division.*

A meeting of the above Division was held at the Royal Hotel, Derby, on Tuesday, January 11th, 1927. The President, Mr. G. J. Furness, presided, and there were also

*Received on May 6th.

present Major T. V. Bagshaw, Messrs. P. M. Evershed, J. D. Fulton, J. Heather, A. Levie, J. McClemont, F. T. Prince, H. W. Steele Bodger, and O. V. Gunning (Hon. Secretary), with Mr. Hamilton as a visitor.

Apologies for inability to attend were received from Messrs. H. S. Cockburn, E. Marrison and H. McIntyre.

The minutes of the last meeting were confirmed.

Mr. J. D. Fulton was nominated by Mr. McClemont for membership of the Division.

The accounts, audited by Messrs. Levie and Evershed, were approved.

Discussion of Fees. This question was discussed at some length and it was decided that the fee for the intra-tracheal injection should be 2s. per head for calves. Tuberculin testing as before, with the addition of a fee for intradermal tuberculin testing of 4s. per head for herds of 30.

Mr. STEELE BODGER exhibited a pair of calipers for measuring intradermal swellings, and a special intradermal syringe.

President's Address. The PRESIDENT said he had no formal speech to make. He thanked the Association for the honour they had conferred upon him in electing him to the Chair. He considered that the Derbyshire Division had more than justified its existence. Excellent papers had been read and good discussions had taken place. He enlarged upon the benefits which accrued from the social side and the better feeling it had made between the members. He asked for the same support as had been given to the other Presidents in the past.

DISCUSSION ON MR. STEELE BODGER'S PAPER.

Mr. LEVIE, in opening the discussion on Mr. Steele Bodger's paper "The Production of Graded Milk," which was published in the *Veterinary Record* of December 4th, 1926, said that he considered the Milk and Dairies Order should be compulsorily carried out. In his view, the initial cost of Grade "A" milk was too high to make its production a paying financial proposition. He discussed the washing of udders *versus* dry rubbing and said that he considered, where practicable, a thorough washing best. Mr. Levie was of opinion that ventilation should be by an inlet between each cow and 6ft. above the floor, with an outlet 16ft. high. He also dealt with the question of lighting, and that of feeding passages in front *versus* feeding passages between cows. Mr. Levie considered all-concrete standings best; there was no need for earth in front. Various methods of sterilising milk vessels were also discussed by Mr. Levie.

Mr. EVERSHED mentioned the possibility of laymen using tuberculin. In regard to the flooring of cowsheds, he considered a very slight slope to be the best.

Mr. HEATHER said good floors and deep channels seemed to be the most essential features. He preferred dry rubbing of udders. He considered tin milking vessels were best for cleanliness and that all milkers should wear arm sleeves.

Mr. MCCLEMONT thought the demand for Grade "A" milk justified its production.

Mr. PRINCE doubted if the present poor price paid for milk warranted a farmer taking all the precautions apparently necessary according to the essayist.

The PRESIDENT thanked Mr. Steele Bodger for his most excellent paper. The subject was one of the greatest importance at the present time.

Mr. STEELE BODGER, replying, said the Milk and Dairies Order was excellent and, if carried out sympathetically, would eliminate much dirty milk production.

If more time was spent on the eradication of tuberculosis in cattle, there would be infinitely less need for all the institutions dealing with tuberculosis in the human subject. He considered the Birmingham district very progressive in this respect, being greatly assisted in this by the Midland Dairies Association. Method had most to do with clean milk. The cleanest milk with which he had to deal was produced from a dairy with very poor buildings, but the farmer had done his utmost with the material available. It was method which counted. The countries with the greatest milk consumption per head were the countries with the cleanest milk, *i.e.*, America and Denmark. He considered washing cows would be an uneconomic proposition; for the udders a slightly damp cloth was best.

With regard to ventilation, Mr. Steele Bodger said that one should always look on inlets with outlets as impossible of producing a down draught. He considered the height for inlet ventilation should be the height of a cow's head when standing. In a shed under his observation, where they could regulate the outlet from 2ft. 6in. to nothing, they had not found it necessary to shut, even on the coldest day, and they had not had a single case of illness. It was condensation that caused trouble, not cold air. It should be the aim to keep the winter coats on the cows until they went out in the spring.

The ideal lighting was by roof lights. A square foot of the roof light was equal to a square yard of wall light. The position of the roof light was important—it should be arranged so that it first gave the rays of the rising sun to the cows.

He was not in favour of feeding passages. In the first place, with a feeding passage, one had no direct ventilation. They harboured dust and dirt, and it was impossible to have a feeding passage and a sufficiently broad gangway without considerably adding to the expense of the shed. If concentrates were used instead of roots there was not the bulk to feed inside. Hay was the greatest disadvantage to no feed passage, but this did not outweigh the advantages.

Regarding the concrete floor, carborundum filings incorporated in the last ½in. of concrete gave a non-slipping surface.

All milk vessels should be rinsed in cold water. Sterilising did not do away with the necessity of washing, and running water should take the place of wash basins; towels were a bug-bear. The human element was the only "fool" factor in the production of clean milk.

On the proposition of Mr. EVERSHED, seconded by Major BAGSHAW, a hearty vote of thanks was accorded to Mr. Steele Bodger for his valuable contribution to the subject of clean milk.

The members were later entertained to tea by the President, Mr. G. J. Furness, who was heartily thanked for his kind hospitality.

O. V. GUNNING, Hon. Secretary.

R.C.V.S. LIBRARY.

The following books and pamphlets have been added to the Library during the past week:—

PAMPHLETS: "Hog-Lot Equipment"; "Bacillary White Diarrhœa of Chicks."

REPORTS: Veterinary Departments Government of the Gold Coast, 1925-26, Kenya Colony, 1925, Veterinary Department of the City of Liverpool, 1925; Veterinary Director-General, Canada, 1925, M.O.H. City of Manchester, 1925, M.O.H. City of Salford, 1925, Civil Veterinary Department, United Provinces, 1925, Bombay Veterinary College and C.V.D., Bombay, 1925-6, Calendar of the Royal College of Surgeons, 1926, Edinburgh University Calendar, 1926-7, Bombay University Calendar, 1926-7; Minutes of Evidence of Select Committee on Patent Medicines; Annual Report of Proceedings under Diseases of Animals Acts, 1925, and the 16th Report of Development Commissioners, 1925.

Books may be borrowed from the Library by members of the College on payment of postage both ways. Apply to the Librarian, 10 Red Lion Square, London, W.C.1.

IMPORTANT NOTICE. The Librarian regrets to report that the following volume has been borrowed from the Library by an unknown borrower and has not been returned —*Notes on the Composition of Scientific Papers, Albutt.*

If this catches the eye of the member who retains the book, will he please return it at once to the Librarian, 10 Red Lion Square, London, W.C.1.

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Sept. 12-17th.—N.V.M.A. Congress at Torquay.

June 13th—Meeting of the Editorial Committee, N.V.M.A., at 4-30 p.m.

June 15th—Meeting of the Scottish Metropolitan Division at the Royal (Dick) Veterinary College.

June 16th—Meeting of the Lancashire Division at Manchester.

June 29th—R.C.V.S. Annual Dinner, 7-30 p.m., Hotel Victoria, Northumberland Avenue, W.C.

Foot-and-Mouth Disease.

At a recent meeting of the Council of Agriculture for England, the Minister of Agriculture (Mr. Walter Guinness) said that, since the last meeting the position in regard to foot-and-mouth disease had again improved, in spite of the disease on the Continent last year having been worse than in 1925, and that year having been worse than 1924. Though it was impossible to state the exact weight which ought to be given to the various factors in the improvement, there was a strong presumption that the meat embargo and the order with regard to the boiling of swill were chiefly responsible. The results had vindicated the action which had been taken, and the Ministry of Agriculture had every intention of maintaining the embargo.

The Late Mr. T. Bowlas, M.R.C.V.S.

" Penrith lost a useful and much esteemed citizen in the early hours of Sunday morning in the person of Mr. Thomas Bowlas, M.R.C.V.S., who passed away with startling suddenness at his residence, Redmayne House, Little Dockray, to the regret of everyone in the town of his adoption," says the *Mid-Cumberland Herald*, of 28th May. " Mr. Bowlas, who was only 54 years of age, and to all appearances had twenty years of usefulness in front of him, passed away in his sleep.

" Mr. Bowlas stood exceedingly high in his profession, and the public confidence in his ability was only heightened by an unassuming manner which inspired trust. He was one of the most courteous and sympathetic of men, and he had a great understanding of animals and a kind way of handling them. He was an especial favourite among dog-lovers, and he had a very large clientèle among these. In the wider field of veterinary science he was one of the best known surgeons in the two counties, and his courteous and genial manner towards everyone made him universally liked.

" In 1916 Mr. Bowlas closed down his practice and joined the Royal Army Veterinary Corps, going direct on active service to France, where he was attached to a mobile veterinary column which followed the fighting line where the equine casualties occurred. He was a commissioned officer, and rose to the rank of captain. He was demobilised after the Armistice, when he resumed his private practice. For many years he was acting veterinary surgeon to the Westmorland and Cumberland Yeomanry.

" Mr. Bowlas was a native of Reddish in Lancashire, his family being the well-known and old-established firm of David Bowlas and Co., cotton spinners and doublers of that district. He graduated at Edinburgh Veterinary College. He came to Penrith many years ago to become assistant to the late Mr. Joseph Pears, M.R.C.V.S., whose daughter he married. He was taken into partnership, and on the retirement of Mr. Pears assumed control of the practice. He was very highly qualified academically, and his large business brought him into touch with all the classes of work that fall to a veterinary surgeon. He succeeded his father-in-law as veterinary inspector for the Urban District Council of Penrith, and made a most efficient officer, especially of late years, when a large amount of extra work was involved in the inspection of meat and in carrying out the provisions of the recent Milk and Dairies Order.

" Mr. Bowlas was a member of the Ullswater Lodge of Freemasons, and last year occupied the position of Inner Guard. He is survived by his widow, to whom much sympathy will be extended."

Professor Macqueen and the Spine of the Racehorse.

" Sabretache," in his " Pictures in the Fire " contributed to *The Tatler*, includes the following interesting note in his series for May 18th :—

" Mr. Macqueen, F.R.C.V.S., the eminent veterinary surgeon, has sent *The Tatler* the following most interesting letter *à propos* some recent notes of mine upon Professor Pycraft's theory that the spines of most modern racehorses do not articulate as they should, and that owing to the weight being placed upon their backs too early in their careers they are forced out of place. Mr. Macqueen being an acknowledged authority is naturally a very valuable witness as to this ; but Professor Pycraft is about to write an article for *The Tatler* in which he will elaborate his theory. In the meanwhile, here is Mr. Macqueen's letter which I am very glad to have :—

> " ' In *The Tatler* for April 27, p. 172, ' Sabretache ' states that ' Mr. Pycraft contends that there is not a single modern racehorse . . . with a sound back, all the upstanding spinous processes, from the withers backwards to the loins, having formed false articulations, and he contends that these are the causes of so many foals whose breeding warrants the assumption of their turning into first-class performers being frequently quite useless. . . .' In my view this statement is much too sweeping, and not in accordance with fact. The spinal bones of the horse, and in particular those of the racehorse, are remarkably free of disease or deformity. In my experience a racehorse with unsound spinal bones is extremely rare. Occasionally, in the aged horse one may find, in the region of the loins, adventitious union or anchylosis of the transverse processes of the 5th and 6th and/or the 4th and 5th lumbar vertebræ. The skeleton of Hermit—foaled 1864, died 1890—shows this union of the transverse processes of the 5th and 6th lumbar bones. Persimmon had no disease of the spinal bones other than that resulting from the accident which led to his death. It may be that Mr. Pycraft has overlooked the effects, on the ligamentous connections of the vertebræ, of the process employed in preparing the bones for a skeleton. In boiling the spine, the intervertebral fibro-cartilages which assist in holding together the bodies of the vertebræ are destroyed ; and under-maceration and subsequent drying of the bones these fibro-cartilages lose volume. In consequence of this loss or shrinkage of the ligamentous tissues, the spinal bones *in the skeleton* are more closely approximated than they would be in the unmutilated spine, and the ' upstanding spinous processes '—at the withers—may touch one another, though they should not overlap unless the segments have been too closely wired. St. Bel prepared the skeleton of Eclipse as a natural one ; that is, he endeavoured to preserve, as far as possible, intact, the natural ligamentous tissues that hold the various spinal and other bones together. Nowadays the bones of the horse are usually exposed to boiling or maceration before being mounted as a skeleton. When comparing a recent skeleton with that of Eclipse, some allowance should be made for the less perfect articulation of the bones in the modern skeleton.—Yours faithfully, J. Macqueen, F.R.C.V.S.' "

Sir D. Hall's Retirement.

Sir Daniel Hall, Director-General of the Intelligence Department of the Ministry of Agriculture since 1920 has just retired, and with his retirement his post lapses.

Condensed Separated Milk.

"The Minister of Health stated in the House of Commons, in reply to a question, that he was informed that imported condensed machine-separated milk was a safe and nutritious food. The answer is curious," says the Agricultural correspondent to *The Times*, "in view of the trouble and expense that are incurred—and the irritation caused—here in order to ensure that butter fat shall not be extracted from milk. It is also contended that milk that is clean merely because it has been cleaned is very different from milk that did not have to undergo a particular cleaning process. As our authorities have no means of investigating or regulating the conditions under which imported produce is prepared, and are exacting in supervising the production of the same articles at home, it seems remarkable that the value and purity of the imports should be accepted with such complacency. I have seen a statement of comparative food values in which one tin of condensed milk is estimated as equal to a pint of new milk, and the cost of the former is given as 6d. to 9d., compared with the 3d. charged for the pint of new milk. The Ministry of Health appears to be disinclined to pursue this question, important as it is, beyond the merest superficial particulars. It is understood that the consumption of this tinned milk is prohibited in all the countries of origin, save one, a fact that, if established, would make it doubtful policy to give it a free market here."

Personal.

Appointment.—The following occurs amongst the notifications received of transfers made by the Secretary of State for the Colonies during the month of May, 1927:—

Mr. G. B. Purvis, F.R.C.V.S. (late Veterinary Officer, Kenya) Veterinary Surgeon, Federated Malay States.

The Transit of Animals.

At a meeting of the Agricultural Committee of the County Council of Dumfries, held in Dumfries on June 2nd, consideration was given to a reply from the Ministry of Agriculture with regard to the Transit of Animals Order of 1927. The committee objected to the requirement that all vehicles used for the conveyance of animals to and from markets shall be cleansed and disinfected between each journey, and asked the Ministry either to revoke that article of the Order or to modify its requirements.

The Ministry's reply stated that it was unable to see its way to comply with the suggestions made. The Ministry, the letter stated, quite appreciated the fact that motor vehicles might be used more than once per day for the carriage of live stock of different owners, but accepting that an element of risk existed—the experience of the outbreaks in Lanarkshire last year showed that even Scotland was not free from the risk of a sudden invasion of the disease—the risk was greatest where vehicles were used on the same day for conveying animals of different owners, more particularly when they were carried to or from markets. This being the case, it appeared to the Ministry to be desirable that such vehicles should be cleansed and disinfected after each occasion on which a vehicle unloaded animals and before reloading with other stock.

After discussion it was agreed to find out what was being done in Ayrshire, Lanarkshire and Roxburghshire, and to confer with Kirkcudbrightshire with a view to making further protest.—*Glasgow Herald.*

"At the Darwen Agricultural Show, held on June 4th," says the *People*, "horses were remarkable for numbers and quality, and breeders exhibiting claimed that notwithstanding the competition of motors there is a steadily improving demand for horses of the right stamp for industrial uses."

Erratum.—On page 504, col. 2, of last week's issue, the account of the funeral of the late Mr. W. Penhale, M.R.C.V.S., was, through a printer's error, stated to be taken from the issue of the *Devon Express and Echo* of March 27th. The date should, of course, have read May 27th.

The City of London Wood Wool Co., Ltd., Plover Works, Hackney Wick, London, E.9, have published a convincing booklet concerning the merits of their popular dog-bedding material "Elastene." Copies may be obtained *gratis* on application to the above address.

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Mr. Gray's Quotation.

To the Editor of The Veterinary Record.

Sir,—The following lines, addressed to Mr. Henry Gray, were prompted by that gentleman's suggestion (see the *Record* of May 28th, page 477) that we should "follow Shakespeare where he says":—

"Polonius, my friend,
If we do not get the reward,
We will do more—
We will deserve it."

Though you search for many a day
You'll not find it, Mr. Gray;
Shakespeare never wrote that way!
You've mixed up that chump Polonius
With a Roman named Sempronius,
Henchman he of Marc. Antonius,
You have indeed distressed us greatly,
Garbled the lines most insensately,
Mauling the master's measure stately,
"'Tis not in mortals to command success,"
But some deserve it more, and others less.
Some verify quotations—some just guess!

Yours faithfully,
Esmond Brown.

Edinburgh.
May 31st. 1927.

Council Election.

To the Editor of The Veterinary Record.

Sir,—May I, through the columns of the *Veterinary Record*, tender my sincere thanks to those 541 members of the Profession who so kindly recorded a vote in my favour at the recent Council Election, and so secured for me a seat on the Council.—Yours faithfully, John Holroyd.

Simmons Street,
Blackburn.
June 7th, 1927.

The Editor acknowledges the receipt of the following:—

Report of a meeting of the Dumfries and Galloway Division, from Mr. A. Young, Hon. Secretary.

Report of the Midland Counties V.M.A., from Mr. H. J. Dawes, Hon. Secretary.

Communications from Messrs. H. Gray, R. H. Smythe, J. F. D. Tutt, W. R. Wooldridge and J. H. Wynne,